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Chilean Railroad Shops of American Design

Plans, Which Won the $20,000 First Prize from European Engineers, Represent the Best Practice in This Country

BY WALTER W. NOWAK*

FOR many years past the Chilean State Railways found themselves badly handicapped in their efforts to keep their road in good condition by the lack of proper shop facilities. As the railroads grew in importance this had become the principal source of an increasing and disproportionate cost in their operating expenses. In 1913 a very progressive and one might say novel step was taken. To assure themselves of the benefit of the experience available in the leading industrial countries they instituted a prize competition and publicly invited the leading engineers in Europe and the United States to prepare plans, specifications and estimates on a complete general repair shop, with an approximate capacity for repairing 500 locomotives a year and a corresponding number of passenger and freight cars.

The work had to be submitted either in Spanish or French, and it is gratifying to note that among those submitting plans and specifications, most of whom were Europeans, there were two American competitors, and that one of these, the Niles-Bement-Pond Co., New York, was awarded the first prize of $20,000. The second prize was divided equally between a Belgian and an English concern. Mention might be made of the fact that none of the German competitors were successful.

The Chilean State Railways then took the next step, and, basing their own plans and specifications on those that were awarded first prize, they asked

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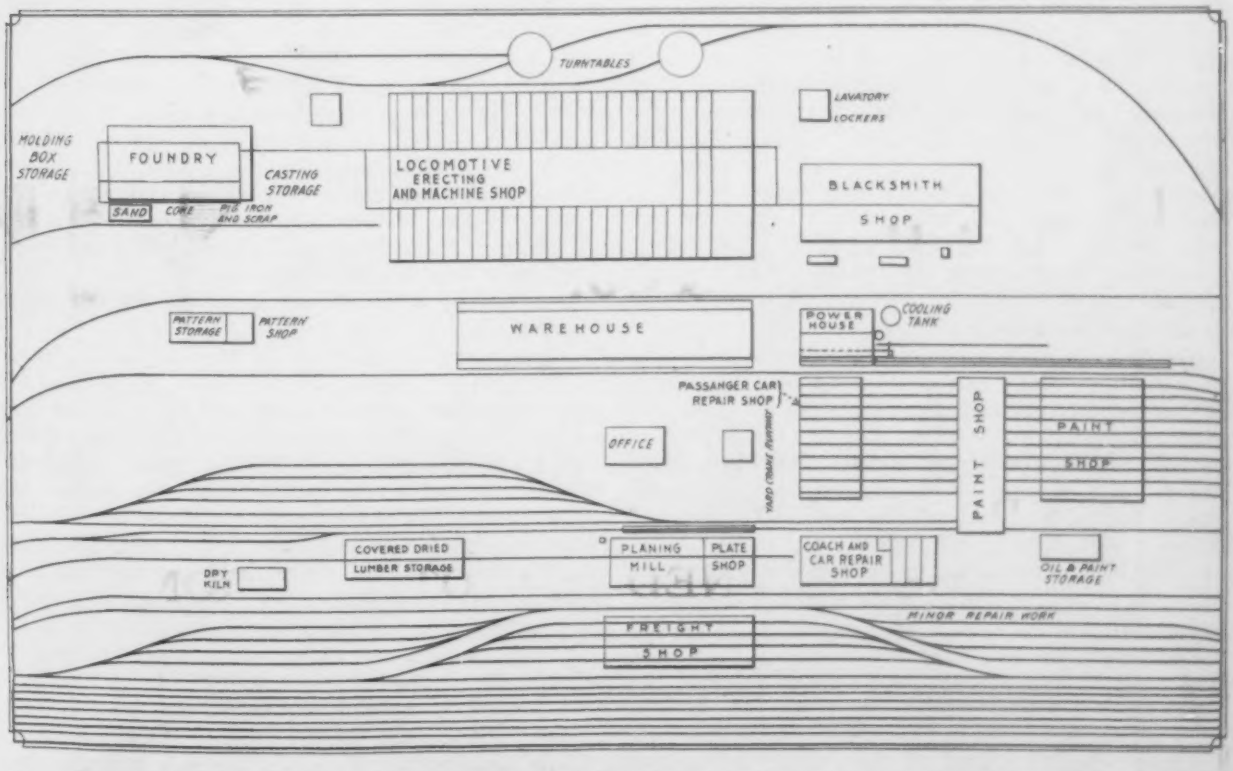


The Arrangement of Tracks and Buildings Assures Ready Access to Supplies and the Steady Progress Through Yards and Shops of All Units Undergoing Repair. Materials from the adjoining foundry, blacksmith shop and warehouse are transported directly into the locomotive repair shop. The car repair tracks, supply buildings and shops are alongside the main line. The central location of the general warehouse makes for least delay, and the power house, similarly placed for efficiency, is also near the forge shop, so minimizing the loss of steam supplied to the hammers. The grouping of buildings permits the use of outdoor cranes, supported mainly on the columns of the buildings

for two tenders, one for the complete machine-tool equipment and the other for the buildings. The Niles-Bement-Pond Co. was awarded the contract for all the machinery and cranes, and a Dutch construction company received the contract for the buildings.

The shops are now under construction a short distance out of Santiago, the capital of Chile, and when finished they will not only be the most complete and modern railroad shops in South America, but will compare with the best in this country. The general arrangement of the buildings is shown in the accompanying plan. The location of the site being parallel to the main line of the railroad, allows the construction of a double entry yard, in which the entrance to the different departments is from one end and the exit from the other. The shops have been so designed that they are susceptible to enlargement in the future if necessary. The buildings have been grouped in such a way as to permit the use of outdoor cranes. A large part of the space served by these cranes will be used for storage of large pieces, such as boiler plates, tires, wheel centers, frames, etc. The columns of the buildings are so placed that they serve to support the outdoor runways wherever possible, and reduce the cost of the runway correspondingly. The materials will be transported between the buildings by means of electric trucks running on well paved passages, which will eliminate the using of narrow-gage tracks with their complicated system of switches, etc.

Layout of the Locomotive Repair Shop

The locomotive shop is of the cross-pit type and is located in the center of all the buildings which have relations with it, such as the foundry, forge shop, warehouse, power station and office building. It is 270 ft. wide by 615 ft. long, having five bays; the two outer or erecting bays contain 38 cross pits. The machine shop is located in the center of the building. Each erecting bay will be provided with a 120-ton crane for traversing locomotives and beneath the large cranes there will be 10-ton stripping cranes. Between the erecting and machine shop bays are two storage bays where the driving wheels, trucks, etc., for each engine can be located, leaving the space around the engine free of obstruction. These bays also contain the heavy machine tools, such as driving-wheel lathes, frame slotters, heavy planers, etc., and the lye-cleaning vats, all to be served by 15-ton traveling cranes. The machine shop proper is located in the center bay with 5-ton cranes running overhead.

In order to save the excessive expense and space of installing tracks, provision is made for the entry of the locomotives into the shops and for their departure, by means of either one of two turntables placed just outside the building. These turntables are so located that a locomotive may enter the shop from either end of the yard by means of either turntable without crossing the other

In addition to the crane service the shops have other facilities for handling the work. There is an industrial railroad system of 5-ft. 6-in. gage (being the gage of this railroad) which runs through the heavy-machine or storage bays on each side of the building and connects with the track for the flue cars which is of the same gage. This track also communicates with that of the foundry located at one end of the locomotive shop and with the forge shop at the other. The two tracks are connected at the center and at each end of the building by means of cross tracks and turntables.

So far as practicable the machine tools working on castings have been located along the track coming in from the foundry and the tools for machining forgings are placed along the other track running in from the forge shop.

Arrangement of the Machine Tools

The latest and most scientific practice has been followed in arranging and classifying the machine tools. Instead of grouping together the various classes of machine tools, such as planers, lathes, drills, shapers, etc., these machines are located in groups determined entirely by the different classes of work which have to be performed and by the sequence of this work throughout the shop. By means of this arrangement the work to be done will be classified according to the natural division which it necessarily occupies in the repairs.

The boiler and tank shops are located at one end of the locomotive building, enabling the same cranes used in traversing locomotives to transport boilers for general repairs. The machine-tool equipment of the boiler shop is located in a wide transverse bay at one end of the building, served by an overhead 15-ton crane. This equipment is divided into two parts, that of the plate shop and that of the flue shop.

The plate shop has an equipment sufficient for the repair and construction of complete boiler shells. It is provided with a hydraulic riveter of special construction for the rapid riveting of entire boiler shells. This riveter is served by a 30-ton electric traveling crane.

The flue department is provided with all the machines necessary to cut off and weld the flues and has also a large capacity machine for cleaning them. This is placed outside of the building. From here cleaned flues are brought in to be cut off and have the new ends welded on.

The Foundry

The foundry and forge shop are so located that the material may be conveniently transported from the locomotive shop or to the car shops. The foundry is designed for a daily capacity of 25 tons, but it is possible to reach a maximum capacity of 35 tons. The foundry building is divided into three longitudinal bays, the central one of which will be much wider than the side ones. The central bay where the heavy molds are made and poured is served by two 15-ton traveling cranes. There are in addition three 1-ton wall cranes. In one of the side bays are located the brass foundry and the light molding floor, served by two 5-ton traveling cranes.

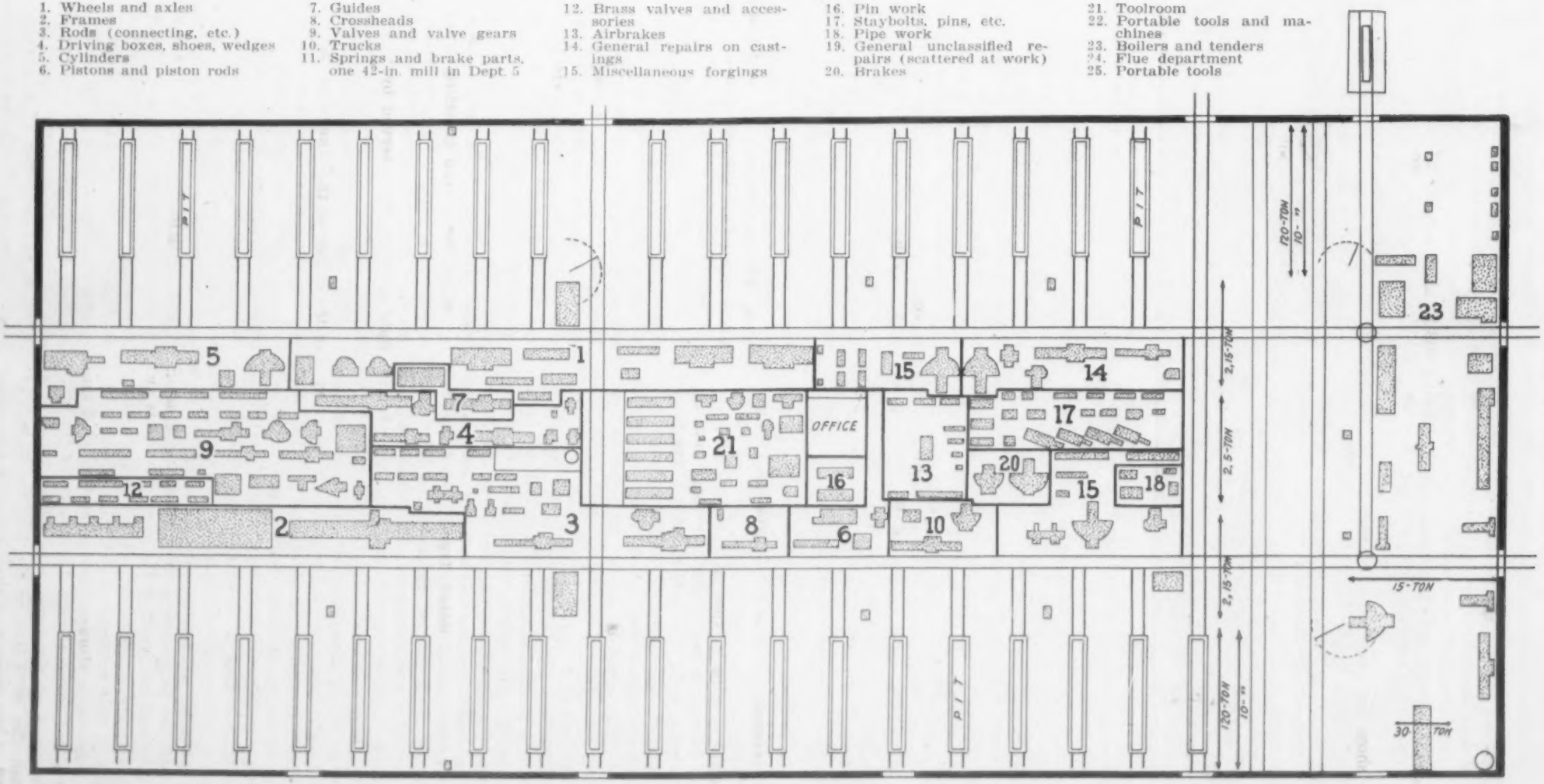
The charging platform of the cupola is placed in the center of the other side bay. At one end of this bay is the cleaning room and at the other the carpenter shop for repairing flasks, and between the latter and the cupolas are two departments, the core department and at the same side of the cupolas the steel foundry. The trusses of that part of the roof over the charging platform of the cupolas are at a higher elevation than those in the rest of the bay in order to give sufficient space. The cleaning room is provided with tumbling barrels for cleaning small castings, which are equipped with an exhauster system for removing the dust. The large castings are cleaned by a sand-blast apparatus located outside of the building in the casting storage yard.

In addition to the crane service there is an auxiliary track of 24-in. gage which connects the different storehouses with the different parts of the foundry. This track is also used by the cars for charging the cupolas. The storage for sand,

THE LOCOMOTIVE REPAIR SHOP

Plan of Interior Showing the Grouping of Machine Tools Into Departments, Each Equipped for Special Work and Placed in Closest Proximity to It. For example, the sections set aside for valves and valve gears, for frames, and for cylinders are located nearest the foundry; those for work on staybolts, pins, brakes, trucks, boilers, tenders, flues, and miscellaneous forgings, nearest the blacksmith shop. All possible work on the heavy parts is located beside the cross pits. This layout was instrumental in winning the competition for its designer. The arrangement is as follows:

1. Wheels and axles
2. Frames
3. Rods (connecting, etc.)
4. Driving boxes, shoes, wedges
5. Cylinders
6. Pistons and piston rods
7. Guides
8. Crossheads
9. Valves and valve gears
10. Trucks
11. Springs and brake parts, one 42-in. mill in Dept. 5
12. Brass valves and accessories
13. Airbrakes
14. General repairs on castings
15. Miscellaneous forgings
16. Pin work
17. Staybolts, pins, etc.
18. Pipe work
19. General unclassified repairs (scattered at work)
20. Brakes
21. Toolroom
22. Portable tools and machines
23. Boilers and tenders
24. Flue department
25. Portable tools



Originally Designed of Structural Steel, War Prices and the Difficulty of Obtaining Deliveries Decided the Chilean State Railways to Substitute Reinforced Concrete Even for the Columns and Crane Runways of the Locomotive Repair and Erecting Shops

scrap iron and pig iron and other materials is outside of the building in the material storage yard, and there is also a space for the scrap breaker.

The foundry has been so designed that the cranes of the central bay can run out of each end of the building through special openings made for this purpose, and continue over the yards on special runways. One of the yards which will serve for the storage of finished castings is located between the foundry and the locomotive shop. The yard at the other end of the building will be used for the storage of flasks. The pattern shop is sufficiently near to the foundry to be readily accessible to the latter and at the same time sufficiently distant to reduce the danger of fire to the minimum.

The Forge Shop

The forge shop consists of two bays extending the whole length of the building with a central line of support columns. One of the bays is devoted to the work of forging large pieces and to the department of springs and bolts. In the other bay general forging work will be done as well as frame and tool forging.

In one part of the heavy forging department there has been laid out a group of equipment for rerolling scrap iron which would otherwise be wasted. In the spring department there is a complete equipment for making springs, both spiral and eliptical. The bolt department has an equipment for the manufacture of a quantity of bolts sufficient for both the locomotive and car shops. In the bay outside the heavy forge department is located the general drop forging department. In the same bay and opposite the spring department is the frame department.

The storehouse is in the most central position to supply all the parts of the plant. It is also in a convenient position for receiving the materials and shipping them over the entire railway system.

The power station also occupies a central position. It is placed near the forge shop to furnish steam to the hammers with a minimum loss in transmission.

Routing for Car Repairs

The freight cars to be repaired and those already repaired are stored on tracks along the main line. The department for the repairs of freight cars is located immediately back of the storage tracks and is divided into three parts. In these are accomplished the different classes of repairs, including both heavy and light. The heavy or main repairs are made in the freight-car repair shop building, which is placed between the two yards that serve for the less important repairs. One of these is devoted mainly to the repair of wooden parts of the cars, and near it is found the wood shop equipped with a dry kiln, dry-lumber storage and lumber yards. The other yard serves mainly for the repairs to the metallic parts of the cars, including the trucks and wheels.

The coach and car shops and the plate shops are laid out conveniently to this yard. The passenger cars to be repaired are placed on the storage tracks, which are also used for minor repairs. When a coach is to undergo heavy repairs, it is switched to a track running along the side of the coach and car shop to the transfer table, which serves both the coach repair and paint shop.

Before placing a coach on the transfer table, it is first stopped in front of the coach and car shops and stripped of all its trimming; then it is placed on the transfer table and taken to the passenger-car repair and erecting shop. Upon leaving the repair shop it continues to the paint shop, which is directly opposite the former. When the painting is finished the fittings are put in place while the car is still in the paint shop, or it is returned to the fixture shop for this purpose. In one case or the other the car continues to the main line at the opposite end of the shop to that on which it entered.

The dry-lumber storage is near to the entrance of the freight-car and passenger-car repair department. The layout of the buildings which have to do the supplying of lumber is such that the material passes in order through the dry kiln and through the dry-lumber storage building to the planers without useless motion.

As it is necessary to handle a large number of wheels in the car department, there has been included a wheel pit. This is sufficiently deep so that the floor of the car on entering the pit is at the level of the surface of the ground.. The freight cars, which bring the wheels, enter the pit and the wheels are rolled out on to the tracks which communicate by means of turntables with wheel and axle machinery in the machine shop of the coach and car shops. Here is where the wheels are changed and new tires put on when necessary.

The design of the buildings was determined mainly by consideration of crane service, light, ventilation and economy of construction. With the exception of the storehouse and the office building, all of the buildings are of a single story and with very few interior subdivisions.

Originally the frame work of all of the buildings was designed of structural steel, some having roof trusses of the inserted V form, provided with monitors, while others have roofs of the sawtooth form. Soon after the outbreak of the European War, however, the price of structural steel rose so considerably that this, together with the difficulty of obtaining satisfactory deliveries, decided the Chilean State Railways to substitute reinforced concrete buildings for those of steel. Even the columns and crane runways are to be made of this material. This is, indeed, a bold step, but recent developments and experience along similar lines point to the entire feasibility of this construction.

USE TRACTOR-TRUCK SYSTEM

Trains of Eight or More Trucks Can Turn in a Small Space

BY E. L. HOWE*

In the plant of the Standard Malleable Iron Co., Muskegon, Mich., is used an industrial haulage combination composed of a three-wheeled electric tractor, a Mercury Type Z, and the Howe truck, which was developed in our plant to get away from the platforms which were used with the old style of lifting truck. The lift trucks and platforms took up too much room, and as we did not have the room to spare we set about developing a truck which would meet our needs.

Our system of handling is simple, but effective. We start off with our trucks in our foundry where castings are broken off into them. From here the man who does the breaking pushes the truck from the molders floor to the gangway and from then on it is handled by the tractor.

The tractor starts at the upper end of the foundry and traveling through picks up the loaded trucks until it has in tow a train of six or eight, which are then taken over into the rolling room department, where they are dropped at their proper destination and the tractor takes back a string of empties which are distributed wherever they are desired. The tractor also goes into our annealing department, hooks to the loaded trucks that are ready for it and draws them to the soft rolling room. It passes on through the rolling room to the trimming room, from the trimming room to the annealing room, and from there on to the packers.

In the entire operation the material leaves the truck only when it is handled for rolling and trimming, just as it would have to do with any hand truck that we might use, and it may also be mentioned that our trucks are used in any number of ways in the course of the day's work.

We have found that by making a coupler and placing it on the back end of the truck we can connect up with other trucks and make a trailing train of anywhere from eight to ten trucks. With a train of eight trailers our tractor can turn in a radius of 15 ft.; loaded or light, it makes no difference. This permits us to operate in a very small space and to turn at sharp angles, and we have found that even on the sharpest turns the last trailer will not show an overtrack of 6 in. over the first one.

The tractor trailer system has cut down labor expense considerably, principally because the men never leave their work to deliver the loads, except to take the trucks to the gangways where they are picked up by the tractor.

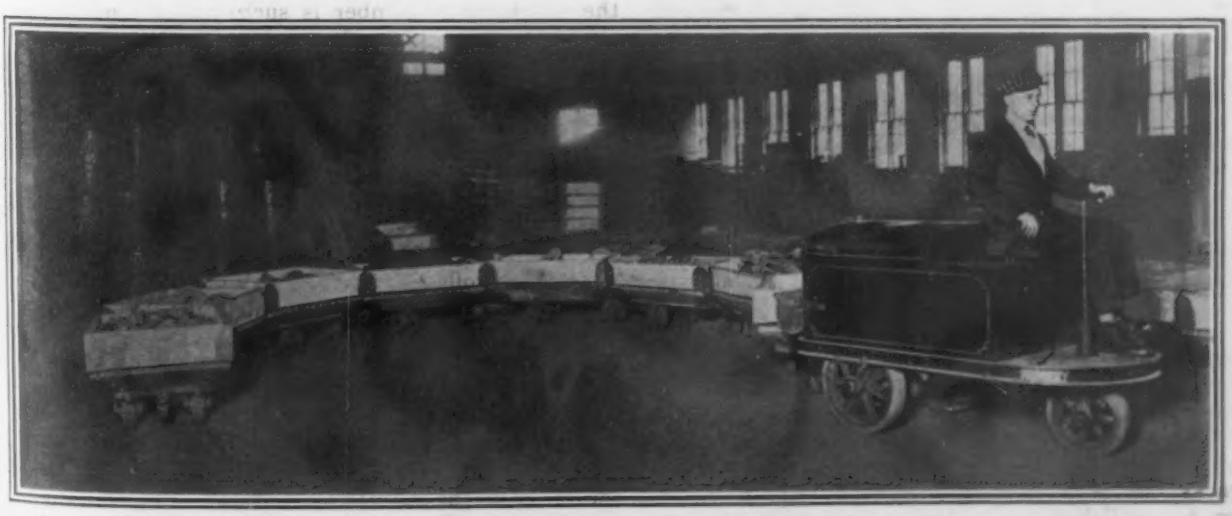
Before we installed this system, when men were pushing the trucks from one department to another, especially on long hauls, they were inclined to loiter on the way, killing time waiting for one another to pass, but this has all been done away with and we can feel and see the difference, not only in the smoother and quicker operation, but in our payrolls, as well. Formerly it was necessary to clear the gangways for one truck, but now when it is cleared a train of eight trucks in tow of a tractor pass through.

It might not be out of place to mention another use to which we are putting our trucks. They are utilized to take the packing from our floors. We shovel the packing from the floor into our trucks, which for this work are used with an entirely different tray, and the packing is left in the tray until the men need it when the truck is pulled up alongside their pot. This method insures us a neater room and makes the material far handier for the men to get at.

The new system has proved most beneficial. Congestion has been relieved, capacity has been increased, haulage costs have been reduced, and we feel that the men who have been replaced by the tractor system are more nearly earning their money at some other job in the plant.

*President Standard Malleable Iron Co.

Wolfram ore is being found in the Chinese districts of Haifeng, Lufeng, P'u-ning, Kityang, and Wuhua. At first it was found in small quantities here and there on the surface of the ground, but recently its existence in vein deposits has been established. The Wuhua district (old name Changlok) appears to contain the largest deposits. It is claimed that over 2,000 booths have been erected as shelter for the people who have flocked there in search of "black gold," as it is commonly called by the natives. With the development of the Wuhua and Kityang fields, Swatow's importance as a market increases, as it is the natural port of export for these districts.



Mercury Electric Tractor Hauling a Train of Howe Trucks in the Plant of the Standard Malleable Iron Co., Muskegon, Mich. The trains can turn in small space

Lake Terminal Railroad Not Common Carrier

Interstate Commerce Commission Decides National Tube Co.'s Railroad at Lorain Is a Plant Facility—Case Will Be Reviewed by Courts

WASHINGTON, July 16.—The important issue as to whether industrial railroads maintained in connection with the big steel manufacturing plants of the country are entitled to allowances, or divisions from the trunk lines has been reopened by the Interstate Commerce Commission which, in a decision from which three of its nine members dissent, holds that the Lake Terminal Railroad, the plant railroad of the National Tube Co., is not a common carrier but is merely a plant facility and therefore is not entitled to allowances or divisions. In view, however, of the decision of the United States Supreme Court in the tap line cases and of "the many important and difficult questions so frequently arising out of the relations between the trunk line carriers and industries with industrial railroads" the commission suggests that the ruling in this case, which presents fairly characteristic conditions, should be promptly reviewed by the courts in order that a definite principle may be judicially established for the guidance of the commission and all the parties in interest. Although the complaint in this case and the evidence adduced in support thereof related solely to the Lake Terminal railroad and its connection with the National Tube Co. and Carnegie Steel Co., the issue has been regarded as of such general interest to the leading steel manufacturing companies that appearances were also entered by counsel for the American Steel & Wire Co., Jones & Laughlin Steel Co., Lackawanna Steel Co., Crucible Steel Co., Corrugated Bar Co., Jos. Joseph & Brothers Co., and others.

Paying Allowances Discontinued

Pursuant to the findings of the commission in the industrial railways case involving the plant railways of a large group of iron and steel industries, the trunk lines in official classification territory on April 1, 1914, discontinued the payment of allowances to industrial railways for handling interstate traffic into and out of the respective plants by which they were owned or controlled. In a supplemental report, the commission in the light of the ruling of the United States Supreme Court in the tap line cases withdrew the conclusions announced in its original report and thereupon, on April 14, 1915, the payment of allowances was resumed on a modified basis to certain industrial railways including the Lake Terminal railroad. The commission, however, has never formally approved the resumption of these allowances an in withdrawing its conclusions in the tap line cases it announced that it would "in the exercise of the duty pointed out by the Supreme Court, undertake at the earliest available opportunity to inquire into any of these allowances or divisions which may seem to be unwarranted or unreasonable or to effect unjust discrimination."

In this proceeding the National Tube Co. sought to secure reparation on its in-bound and out-bound interstate traffic that moved during the period from April 1, 1914, to April 14, 1915, basing its demand on the claim that during that period it paid the switching charges of the Lake Terminal railroad in addition to the line haul rates of the connecting carriers. The complaint, therefore, is really directed against the trunk lines by which prior to April 1, 1914, these switching charges were absorbed. The primary question, therefore, is whether the Lake Terminal railroad is in fact a common carrier.

Conditions at Lorain

The evidence shows that the Lake Terminal railroad is the plant railway at the Lorain plant of the Tube company and both companies are owned by the same interest. Except in the matter of its great size, that plant and its plant railroads are characteristic and typical of many plants and plant railroads scattered throughout the country; and the considerations which compel the commission to deny the demand of the Tube company for reparation in this proceeding, and to hold that the continued payment of allowances to its industrial railroad is unlawful, involve a principle that must be understood as having equal application at other similar industries.

The National Tube Co., the commission says, belongs to the class of plants that occupy many acres of ground covered by a large number of buildings and structures. In addition to its tube mills, there are also rolling mills, rail mills, blast furnaces, open-hearth works, Bessemer works, a large ore dock, a dockyard, a brickyard, and a large yard for the storage of rails. Within the plant area is an intricate system of standard and narrow gage tracks connecting the various buildings and different parts of the plant property. There are also several groups of storage tracks in the plant that are shown on a map as yards. All these plant tracks, both standard and narrow gage, are used in one way or another in the manufacturing and internal processes of the industry. At convenient places near the plant gateways, have been established the plant interchange tracks, which are sufficient to accommodate a large number of cars. The plant is surrounded by a fence, but that fact the commission regards as of no special or controlling importance; without a fence it would still be a plant in the sense in which that phrase is here used.

The right of way of the Baltimore & Ohio Railroad forms the western boundary of the plant, and the interchange tracks just mentioned between that carrier and the plant are quite extensive and were formerly inside the plant, but, as the result of a purchase of land by the Baltimore & Ohio from the Tube company or its industrial railway, now immediately adjoin the plant. The interchange tracks of the other trunk lines lie outside the eastern boundary of the plant. The line carriers deliver the cars at and take them from these several plant interchange tracks; and this the commission regards as their duty under their line-haul rates even in cases where that may involve a switching service. The industrial railway takes the cars from the interchange or storage tracks and moves them to various points within the plant as required. The industrial railway also moves loaded and empty cars from different points within the plant and delivers them to the line carriers at the plant interchange tracks. For this service by its industrial railway during the period of the action, between the interchange tracks with the line carriers and various points within the plant, the Tube company demand reparation from the line carriers. The Carnegie Steel Co., the only other complainant, demands reparation on shipments of iron ore handled through the plant by the Tube company's industrial railway and delivered on the interchange tracks to the line carriers. The sole question for determination is whether an allowance therefor out of the line carriers' rates is lawful; or, to put the inquiry in another form, where does transportation by the line carriers under their line-haul rates begin and end in the case of an industrial plant like the one described?

Not Accessible to Public

In analyzing the contention that the Lake Terminal Railroad is a common carrier, the commission says:

> The Lake Terminal Railroad Co. is incorporated under the laws of the State of Ohio as a railroad company. But except in a very limited way it is not accessible to the public. Its tracks are not only completely enveloped by the plant but are inclosed within a plant fence; the industry is thus securely protected against any demand upon its plant railway by the public for a service of transportation, and the plant railway is enabled to devote its facilities and entire

energies to serving the proprietary industry, as was apparently intended.

With a lacework of standard gage and narrow gage tracks running into and about various parts of the plant and all contained within the plant and inaccessible to shippers, with some 35 locomotives and 700 or 800 cars of various kinds in use, there is little basis for the contention that the Lake Terminal Railroad was intended to be or has a real and substantial opportunity to be anything other than a plant facility. That is its actual daily function for the controlling industry.

The commission points out, however, that even a plant facility under Section 15 of the Interstate Commerce Act may lawfully have an allowance out of the carrier's line-haul rate when performing a service of carriage for it. In this case the evidence shows that during the non-allowance period covered by this controversy the service commenced and ended at the several plant interchange points indicated in the tariffs of the trunk lines, which fact, the commission asserts, defeats the claim of the complainant that the Lake Terminal Railroad was entitled to an allowance out of the line-haul rate.

Taking up the complaint of the Carnegie Steel Co. against the line carriers, the commission says that the evidence shows that these carriers transported ex-lake iron ore to the complainant's furnaces at several points in Ohio and Pennsylvania from the plant interchange tracks of the Lorain plant of the National Tube Co., but during the period in controversy did not absorb the charges of the Lake Terminal Railroad for its service in moving the ore from the dock within the plant to the plant interchange points, but collected their line-haul rate from the plant interchange points, leaving the charges of the Terminal company to be paid by the Carnegie Steel Co. in addition to the line-haul rates. The Carnegie Steel Co., therefore, contends that it was overcharged to the extent of the Terminal Company's charges.

Unlawful Contributions

Notwithstanding these facts, the commission decides that the defendant line carriers "lawfully and properly provided that their rates on this ore of the Carnegie Steel Co. commenced at the Tube company's plant interchange tracks, and any allowance at this time for a service, which we find from all the facts of record not to be a part of a service of transportation, would be an unlawful preference of the Carnegie Steel Company." The commission, therefore, holds that the present tariffs of the line carriers should be adjusted accordingly. In summarizing the case, the commission says:

> It is suggested that the outcome of the conclusions here reached will be "an immense increase in freight charges paid by shippers with no increase in the service rendered." It would, we think, be a sounder and more logical view of the situation to say that the outcome will be to prevent unlawful contributions to industries by line carriers in the form of free services or allowances, and to place upon industries an expense in connection with their industrial operations which in many cases is now being borne for them by the line carriers.
>
> It follows from all that has been said, and we find that the service performed between the plant loading and unloading points and the plant interchange tracks hereinbefore described, by the Lake Terminal Railroad Co., is a plant service and is not a service of transportation which may be included in and paid for out of the line rates; and that any allowances or divisions by the line carriers out of the line rates on account of such plant service is unlawful and would result in undue or unreasonable preferences and unjust discriminations. These complaints must therefore be dismissed and an order will be entered directing the line-carrier defendants to cease and desist for a period of two years from making any such allowances or divisions.

Dissenting Opinion

Commissioner Hall, who submits an elaborate dissenting opinion, draws an interesting parallel between the service performed by the railroads involved in the tap line cases and that of the Lake Terminal Railroad. In the tap line cases, the Supreme Court held that the fact that the great bulk of the traffic over the tap lines was that of the lumber companies owning the lines did not determine the fact whether they were or were not common carriers, and in this connection Commissioner Hall cites the evidence that the Lake Terminal Railroad during the twelve and a half months in controversy carried the goods of 33 shippers beside the National Tube Co. He also cites the fact that the Lake Terminal Railroad was held to be a common carrier by the Ohio Public Service Commission, and for a number of years "has been treated as a common carrier by the trunk lines both before and since the period during which the absorptions were canceled." Chairman Daniels and Commissioner McChord join in the dissenting opinion.

W. L. C.

An Automatic Rack for Soldering Irons

To support and protect electric soldering irons when not in use, the Cutler-Hammer Mfg. Co., Milwaukee, has recently developed an automatic rack and control panel. The amount of current taken by the iron is decreased when it is placed in the rack after being used, thus to prevent the iron from overheating, to avoid burning out heating units, to effect savings in current consumption and also to encourage orderliness by providing a convenient connection place and support for the iron.

Placing the Soldering Iron on the Hook Support Automatically Reduces the Current Passing through the Iron and Prevents Overheating, while the Full Strength Is Available as Soon as the Iron Is Removed from the Hook, thus Avoiding any Delay in Heating

The rack acts on the same principle as the telephone receiver hook. When the iron rests on the support, resistance on the back of the panel is inserted in the circuit with the iron. At the bottom of the panel, a push-button snap switch and a standard receptacle to which the plug of the soldering iron cord is connected are provided.

A special type of pliers for cutting very hard wire, such as is being used in the barb-wire entanglements between the trenches, has been brought out by Kraeuter & Co., Inc., Newark, N. J. The new tool is a one-handed affair 11 in. long and weighs 16½ oz. It is stated that this tool will take the place of a 24-in. bolt cutter requiring two hands for its operation which was the only available tool that the United States Engineering Depot could find after a search of three years.

The Independent Filter Press Co. has removed its offices from 47 West Thirty-fourth Street, New York, to 418 Third Avenue, Brooklyn.

Real Results of Americanization Schools

Youngstown Sheet & Tube Co. Finds That Efficiency Has Been Promoted and Will Start Additional School at Hubbard Furnace

IN accordance with its practice of affording to its employees every advantage in the way of increasing their efficiency, promoting their happiness, and uplifting their ideals of life in the workshop and in the home to the American standard, the Youngstown Sheet & Tube Co., Youngstown, Ohio, early in 1917 established a system of free schools. This system was the result of much thought, and was designed primarily for the benefit of the foreign-born employees in all departments of the mills, but at the same time it was deemed wise to offer its opportunities to others than employees of the company, and to also include among those to be benefited by it the women connected with the households of non-English-speaking workmen.

With this end in view, through its industrial relations department, the company opened on Jan. 8, 1917, in the Gordon Avenue School Building at East Youngstown, where most of its foreign-born employees reside, the first of these schools. The initial enrollment contained the names of more than 90 men and a few women. The organization was completed under the direction of George B. Fout, who, as supervisor, has since that time had charge of this school and the additional schools conducted at East Youngstown, Struthers, and the camp community on the south side of the main plant.

The course consists of reading, writing, spelling, grammar and arithmetic. At the beginning, six teachers were employed, and the first term, beginning on Jan. 8, closed the first week in June. During this period regular sessions were held on Mondays, Tuesdays and Wednesdays. The first session, from 8.30 to 9.30 in the morning, was intended for men employed from noon until midnight, the second session, from 3 to 4 in the afternoon, for those employed on the night turn; and the third session, from 7.30 to 9 o'clock in the evening, for men employed on the day turn. Women were admitted to all these sessions and encouraged to attend those which were most convenient.

Classes in Citizenship

In addition to the regular sessions, special classes for instruction in citizenship, civics, and kindred branches, were conducted on Thursday of each week. These classes were especially designed to assist applicants for citizenship, and in them were taught the underlying principles of American government. The relation of the individual to the village government, and that of the village to the city, the State, and the nation, were brought out as fully as possible.

During the first year 50 per cent of all who enrolled in these schools attended every session, unless they were detained by their employment or by some other cause, and the success of the movement was such as to lead to its extension at the opening of the second term, which was done during the first week of September, 1917. At that time additional schools were established in the Holy Trinity parish schoolhouse at Struthers and in a building erected for that purpose at the large industrial camp near the main south gate of the works. The enrollment at the beginning of the second term had risen to more than 200, and contained a few additional women. In spite of the fact that special efforts have been made to enlist the interest of foreign-born women in these schools, not much success has been achieved, probably because of their many home duties.

Enthusiasm of Teachers

The increase in the number of schools led to the employment of 14 teachers during the 1917-1918 term. These teachers were selected chiefly from among the teachers of the public schools of the city of Youngstown, and were paid only for the time they were actually engaged in the work. Very much of the success of the schools has been due to their enthusiastic devotion to this work, and it would seem that one of the conditions necessary to the efficient operation of such schools is a spirit similar to that shown by these teachers.

During the second term, embracing the period from September, 1917, to June, 1918, attendance at the classes was even more satisfactory than during the previous term, and the results accomplished toward Americanization of those enrolled were appreciably better. During this term about 175 men who had been attending these schools entered the military and naval service of the United States, either by enlistment or through the operation of the selective service law, and during the same period more than 200 employees of the company made application for American citizenship. Gratifying as this fact is, it had the effect of reducing somewhat the attendance at the schools, since the impression was created that such attendance was in some way likely to increase liability to military duty. Nevertheless, during this period not less than 500 men and women attended these schools at various times, and the greater portion of them showed marked progress in a knowledge of the English language as well as of American customs and ideals. A feature of the instruction which was found most beneficial was that along the lines of home ideals and sanitation. Vocal music was also encouraged in the schools, and had a beneficial result each year.

Special Exercises

At the closing of the term special exercises were held, including addresses, music, and the presentation to those who had been faithful in their attendance of a certificate attesting the appreciation by the company of their desire for self-improvement.

At various times during the terms, dinners and entertainments were given in connection with these schools. These were attended by the president, one or more of the vice-presidents, and other officials of the company, as well as by about 75 superintendents and foremen. Some of the latter were accompanied by their wives, and all mingled freely with the pupils of the schools. At the last of these about 450 persons attended, and the gathering resulted in much encouragement for the movement.

Arrangements have been made for the continuation of the schools already established and the starting of an additional school at the Hubbard furnace of the company, where it will be available for the employees of those furnaces as well as for those in a large industrial camp located in that vicinity. It is probable that during the coming term, which will open on the second Monday in September, the services of at least 20 teachers will be required.

Results of Inquiry

During the last term efforts were made to secure practical evidence of the value of these schools from an industrial standpoint. Fifty check numbers were selected from among those assigned to workmen attending the schools, and these were submitted to the general superintendent, who caused to have made, through the superintendents and foremen of the various departments in which these men were employed, an investigation as to the effect of their attendance at the schools. In every case it was found that these men were among the most efficient, careful and satisfactory workmen in their departments. In view of this fact the company has made an effort to have it generally understood among foreign-born workmen that their attend-

ance at these schools will be appreciated, and will redound to their benefit as employees.

The general observation may be made that these schools, regarded as among the most successful connected with any industrial plant in the country, owe a portion of their success to the peculiar conditions existing at this plant, where a very large portion of the foreign-born employees live in the village of East Youngstown, and form practically its entire population. As a general proposition, experience suggests that this Americanization work can be efficiently and economically performed through the public-school system, and wherever it is possible to secure proper cooperation on the part of the school officials this is probably the better plan. Difficulty will be found in working out such a plan in many places, particularly where neither the revenue of the schools nor the public spirit of the school boards is such as to induce them to take on the additional burden of Americanization schools.

Steel Loading and Shipping Deck

To enable freight cars to be utilized to their full capacity for the transportation of automobiles, motor trucks, tractors, etc., the Carbo Steel Products Co., Chicago Heights, Ill., has developed a loading and shipping deck. This is built up of structural steel members and it is pointed out can be used either with a box or flat car for increasing the capacity from 60 to 100 per cent. This is made possible by enabling the load to be double decked.

The decks are made in one type only but besides being available for any type of car, may be used for inclined loading. In assembling the decks preparatory to use, all of the bolts are tightened and lock washers used. The decking is then placed around the freight loaded on the floor, say a vehicle, and the upper one is swung into place as illustrated. For box car loading the process is reversed and the upper automobile is hoisted into position on the decking by endless ropes running through the spokes of each wheel underneath the hubs and passing over four lifting blocks. It is pointed out that the wheels need never be taken off the vehicles in the upper tier, although sometimes it is found desirable to remove the tires and compress the springs. Adjustments are provided in the decks to clear the lower automobile with the tires on or off, with the tires off and the springs compressed or with the wheels off and the springs compressed.

A Framework of Structural Steel Makes It Possible to Load either Box or Flat Cars to Their Rated Capacity

Thomas Meters for Coke Oven Gas at Toledo

Gas from the coke oven plant of the Toledo Furnace Co. is being used by a number of industrial plants at Toledo, Ohio. This gas is purchased and distributed by the Toledo Railway & Light Co., and for measuring it seven Thomas meters built by the Cutler-Hammer Mfg. Co., Milwaukee, are in use. There are two meters installed at the measuring station at the plant of the furnace company and the other five were installed at the plants of the Willys-Overland Co., the Mather Spring Co., and the Libby Glass Co.

The War Trade Board has placed graphite crucibles upon the list of restricted imports. All outstanding licenses for the importation of graphite crucibles have been revoked as to ocean shipments after July 15, 1918, and no licenses for the importation of this commodity for shipment after that date will be granted for the rest of the calendar year. Imports of graphite are already prohibited.

Sixty coke ovens, under the course of construction for eighteen months, were placed in operation at the Steelton, Pa., plant of the Bethlehem Steel Corporation last week. The ovens were erected by the H. Koppers Co., Pittsburgh. The Steelton plant now has 180 ovens in operation.

The Pacific Coast Steel Co., Portland, Ore., is preparing the ground for the erection of a steel plant on property adjoining the land purchased some time ago. The new plant will be equipped with two open-hearth furnaces. T. A. Clingan, general manager, is in the East to purchase machinery and equipment.

Co-operation in Industrial Research

Movement to Nationalize the Work—Its Importance to the Nation—Views and Achievements of Leading Workers

A FEATURE of the regular annual meeting of the American Society for Testing Materials at Atlantic City the last week in June was a topical discussion on co-operation in industrial research. The society considered this so vital a matter that, in order to emphasize its importance to the nation, a whole evening was devoted to the subject. The report of the convention's proceedings in THE IRON AGE, July 4, referred to this matter and published in full the opening address by Dr. Henry M. Howe, chairman, engineering division, National Research Council.

Several prominent leaders in research work in the country contributed to the discussion and abstracts of their remarks are here presented. Besides an opening announcement by the late Dr. Edgar Marburg, secretary-treasurer of the society, and Dr. Howe's introductory address referred to, the recent work in this line in Great Britain was explained by John Johnston, secretary National Research Council; the large industrial research laboratory was represented by Arthur D. Little, president, Arthur D. Little, Inc., Boston; the work of this nature as done by a large corporation was reflected in the remarks of Dr. Charles L. Reese, chemical director, E. I. duPont de Nemours & Co., Wilmington, Del., and the organized and centralized work of a large industry made up of small companies was represented by Frank E. Gorrell, secretary, National Canners Association, Washington.

Opening Announcement

BY DR. EDGAR MARBURG*

This discussion on "Co-operation in Industrial Research" had its origin in a suggestion from Dr. John Johnston, secretary, National Research Council, and a member of this society. In support of this suggestion Dr. Johnston submitted a written statement which impressed the writer so forcibly that he should like to quote from it as follows:

One of the most striking consequences of the war is the increasing general realization of the primary importance of scientific research to the whole question of national defense, as well as to the successful prosecution of industry and the greatest measure of economy of resources after the war. . . . Impressed by the paramount importance of promoting the application of science to industry in this country, the National Research Council has taken up the question of the organization of industrial research; it believes that this matter should be furthered in every way possible and as rapidly as may be for the following reasons: In the first place, because of the necessity of rapid technical advance in many industries if we are to compete successfully with other nations both now and after the war; secondly, because any steps taken in this direction will react immediately to further the general appreciation of science and of its usefulness when applied; thirdly, because the present time is conducive to the growth of new ideas—indeed such a favorable opportunity may not recur.

Accordingly the National Research Council has inaugurated an Industrial Research Section, which shall consider the best methods of achieving such organization or research within an industry, or group of related industries (for example, industries using the same raw materials, or with similar waste products). It considers that co-operation between capital, labor, science and management constitutes the best general means of financing and directing the extended laboratory investigations and the large-scale experimental and development work required for adequate industrial research. In pursuance of this general plan, it proposes to establish an Advisory Committee, composed of strong men with the imagination to foresee the general benefits which would certainly follow from the further progress of science and from a more general and more thorough application of science to industry.

Indeed, if the war has proved one thing it is that not only the safety of a nation in war but even its protection against the menace of war, depends largely on the degree to which she has attained *complete independence* from other nations in the matter of resources essential to the prolonged conduct of war.

*Late Secretary-Treasurer, American Society for Testing Materials.

Developments in Great Britain

BY JOHN JOHNSTON*

The commanding position held for so long by a large number of British industries had created a deeply rooted feeling of security among a large body of manufacturers; this, coupled with a natural conservation and with the circumstance that the heads of many industries have not been educated in such a way as to enable them to appreciate scientific knowledge, was a hindrance to the adoption of proposals for research work in industry there.

It had not been generally realized that industrial conditions were changing, and that many of the conditions which originally enabled British industries to assume a pre-eminent position had ceased to exist. The war, however, brought this fact home, and produced a change in attitude which otherwise would have required a very much longer period to achieve; directly, by the necessity of many lines of research work to the production of munitions and to the prosecution of the war in general; indirectly, by the fact that many firms were forced to adapt themselves to entirely different lines or methods of manufacture, many of which depended for their development upon research work. British scientific men had for years been pointing out the necessity for the greatly extended application of science to industry, but no definite action was ever taken until about a year after the beginning of the war when a White Paper, signed by Arthur Henderson, at that time a member of the British Cabinet, appeared.

This document is entitled "Scheme for the Organization and Development of Scientific and Industrial Research;" its first paragraph is so pertinent that it is quoted here:

There is a strong consensus of opinion among persons engaged both in science and in industry that a special need exists at the present time for new machinery and for additional State assistance in order to promote and organize scientific research with a view especially to its application to trade and industry. It is well known that many of our industries have since the outbreak of war suffered through our inability to produce at home certain articles and materials required in trade processes, the manufacture of which has become localized abroad, and particularly in Germany because science has there been more thoroughly and effectively applied to the solution of scientific problems bearing on trade and industry and to the elaboration of economical and improved processes of manufacture. It is impossible to contemplate without considerable apprehension the situation which will arise at the end of the war unless our scientific resources have previously been enlarged and organized to meet it.

It appears incontrovertible that if we are to advance or even maintain our industrial position we must as a nation aim at such a development of scientific and industrial research as will place us in a position to expand and strengthen our industries and to compete successfully with the most highly organized of our rivals. The difficulties of advancing on these lines during the war are obvious and are not underestimated, but we cannot hope to improvise an effective system at the moment when hostilities cease, and unless during the present period we are able to make a substantial advance we shall certainly be unable to do what is necessary in the equally difficult period of reconstruction which will follow the war.

By this document the State had "recognized the necessity for organizing the national brain power in the interests of the nation at peace. The necessity for

*Secretary, National Research Council, Washington.

the central control of our machinery for war had been obvious for centuries, but the essential unity of the knowledge which supports both the military and industrial efforts of the country was not generally understood until the present war revealed it in so many directions as to bring it home to all. War has remained as much an art as ever, but its instruments, originally the work of the craftsman and the artist, are now not only forged by the man of science; they need a scientific training for their effective use. This is equally true of the weapons of industry. The brains, even the very processes, that to-day are necessary to the output of munitions were yesterday needed, and will be needed again to-morrow for the arts of peace. This is the central fact which justifies the establishment of the new machinery in the midst of a struggle that is absorbing the whole energies of the nation in a way no previous war has done."*

The scheme thus promulgated is designed to establish a permanent organization for the promotion of scientific and industrial research; it provides for a small advisory council, "composed mainly of eminent scientific men and men actually engaged in industries dependent upon scientific research," whose primary functions are to advise on proposals:

> For instituting specific researches;
> for establishing or developing special institutions or departments of existing institutions for the scientific study of problems affecting particular industries and trades;
> for the establishment and award of research studentships and fellowships.

In accordance with these instructions, the Council made a survey of the whole field, and as a preliminary measure gave aid and encouragement to a number of researches which were being carried on by various technical societies, institutions or committees.

The main work of the Advisory Council, however, was concerned with the organization of industrial research; firstly because they felt "the paramount importance of arousing and securing the interest of manufacturers in the application of science to industry, and secondly because the influence of the war has created in industry an atmosphere conducive to the growth of new ideas, whereas it has unfortunately made the prosecution of work in pure science and in its organization a matter of extreme difficulty."

As its work along these lines developed, it became clear that a separate organization having its own estimates in charge of a minister responsible to Parliament was a necessity. Accordingly in December, 1916, there was established a separate Department of State entrusted with the organization of scientific and industrial research; and under this department an Imperial Trust was created to hold, on behalf of the department, the sum of one million sterling which Parliament had placed at its disposal to be spent over a period of five years or so. In addition to this sum there is an annual appropriation to cover the cost of those researches which will not be undertaken by the Research Associations; the grants to individual workers, both students and others; the cost of administration. The department now is in charge of the National Physical Laboratory, which heretofore was supported largely by the Royal Society, and has established a Fuel Research Board to deal effectively and systematically with the urgent problem of fuel economy. It was agreed that the money thus made available should be spent in the form of grants in aid of research undertaken by firms in any industry which may combine to conduct it on a co-operative basis; and that the best means to this end is the establishment of Trade Research Associations.

The plan of founding such a Research Association has been under consideration in several industries; the most substantial progress has been made by the cotton industry, a provisional committee of which has worked out a scheme of procedure in considerable detail. They are establishing the British Cotton Research Association that will include as members cotton-spinning and thread-making firms, manufacturers of cloth, lace and hosiery, bleachers, dyers, printers and finishers; it will conduct researches which include the study of the cotton plant at one end and the "finishing" of the manufactured article at the other, and also encourage and improve the education of persons who are, or may be, engaged in the industry. They have published a very interesting pamphlet on "Scientific Research in Relation to Cotton and the Cotton Industry" in which a popular account of the matter is given.

It would lead too far to go into this matter; but this report brings out one important point deserving of mention here—namely, with respect to the cost of such research work to each member of the association. On the basis that the association would spend $250,000 a year on research work, it is shown that the cost to each member would be only about 10 per cent of his fire insurance premium, 25 per cent of the cost of health insurance, and about 20 per cent of the cost of employers' liability insurance. In other words, the scientific and technical health of the industry can be insured at a very small cost. Indeed, this is one of the best ways to look at the matter, that research is an insurance, or an amortization of the relative depreciation of the art caused by advances by others and in other directions, and therefore that it is just as proper to consider expenditure on research to be a fixed charge as it is to include charges for insurance or for depreciation.

The most noteworthy point is the changed attitude on the part of manufacturers toward science and education, for without such a change little could have been accomplished. May I add that the general conditions which confronted Britain will soon confront us likewise, if indeed they are not already here, and suggest that their schemes be given careful consideration as being one means of securing greater efficiency in industry and greater economy in the use of our resources of men and materials?

*Report of the Committee of the Privy Council for Scientific and Industrial Research for the year 1915-16 (Cd. 8336), page 9.

Organization of Industrial Research

BY ARTHUR D. LITTLE*

We have long known, as the public at large is beginning to recognize, that research is the prime mover of industry. During all the years of its existence our society has been, through its committees and its membership at large, the exponent and practitioner of industrial research. One has only to review the history of a single specification, like that for steel rails, to realize the wide range and splendid quality of research which it connotes and epitomizes.

The war, which has changed everything, has given a new aspect to research. Hereafter the nation which would live must know. Through the wreck and peril of other peoples, Americans have learned with them that research has something more to offer than intellectual satisfactions or material prosperity. It has become a destructive as well as a creative agency and in its sinister phase the only weapon with which it may be fought is more research. The organization and intensive prosecution of research has thus become a fundamental and patriotic duty which can neither be ignored nor set aside without imperilling our national existence.

In considering any plan for the organization of research, one is immediately confronted by the difficulty that science in its highest expression is essentially individualistic and democratic. It resents autocratic control, languishes and becomes sterile under minute oversight and direction from outside. The great advances in human knowledge have almost invariably been due to individual effort set in motion by the scientific imagination and sustained by a consuming desire to ascertain the truth. Pasteur, Curie and Rutherford were not dependent on organization for their results. They worked to the best advantage in proportion as they were free to follow the vision which moved before them. No amount of organization can make a Faraday. It may, perhaps, discover one, and

*President, Arthur D. Little, Inc.

is then privileged to provide encouragement, working facilities and recognition. With these assured, it is the part of wisdom to leave him as much alone as possible.

Any really effective plan of research organization must provide for the exceptional man, the man whose angles have not been ground down, who is sometimes not comfortable to rub against, but who has the spark of genius. He is usually a man who hates rules and systems, regular hours, time slips and all the paraphernalia of organization. Organization can help him none the less by relieving him of burdens, making him master of his own time, furnishing equipment, providing organized and immediately available library facilities and by directing his attention to specific problems.

While the superlative work in science, like the superlative work in art, must always be an expression of the genius of the individual and quite beyond the power of organization to insure, there remains a vast deal of what may be called the secondary work of rounding out the great discoveries and especially of giving them an industrial application which may be rendered most effective only through proper organization. The nimbus which, just at this time, surrounds the word "research" should not blind us to the fact that research involves a great deal of hack work, work for good honest plodders who accumulate the data which permits or confirms the generalization or which is required to give it practical effect.

Aims of Research

Broadly stated, the aims of research organization should be:

To find, develop and train men.

To create such a background in the public mind as shall insure support for research and the industrial utilization of research results.

To secure co-operation between different branches of science, as for example between chemists and mathematicians. The fortuitous combination of the mathematical mind with the viewpoint of the chemist in Willard Gibbs laid the basis for physical chemistry. But such a combination in a single individual is very rare.

To avoid repetition and duplication of effort, first by rendering present knowledge readily available to research workers, second by applying clearing house methods to research projects.

To stimulate research by emphasizing the importance of specific problems, making special grants, rendering material and facilities as generally available as possible.

To furnish a sort of general staff for research which shall work out the plan of attack for major problems, assign the several lines to competent workers and co-ordinate and focus the whole.

To bring home to manufacturers the advantages of research with the view of promoting the establishment of private, corporation and group laboratories.

To make and publish a census of available research facilities in men and equipment.

To survey the natural resources of the nation and direct research toward their development.

To appraise our great industrial wastes and develop plans and methods for turning them to profitable use.

There is nearly universal tendency to attempt the accomplishment of these results through the agency of councils and other forms of committee organizations, the members of which are almost without exception unpaid and involved in other activities which have prior claims upon their time. While such systems of organization may be temporarily efficient and even the only ones immediately available in times of sudden crises, they do not lend themselves effectively to the slow, constructive work of years without which it is impossible to establish research in its proper place in the industrial and other activities of a nation. There is danger in an organization chart, danger that it be mistaken for an organization. The work of committees is notoriously cumbersome and slow. More and more power must be developed by the central body to overcome the inertia of the augmented mass. The whole may ultimately break down from its own weight.

It appears, then, that we may have still to evolve a permanent, coherent and progressively effective form of organization for the promotion and co-ordination of research. This may perhaps appear in the shape of a great foundation closely affiliated with the Government, the universities, the technical societies and the industries, which shall have its broad policies directed by a board, wholly divorced from politics, yet intimately in touch with the trend of science and the needs of industry, and which shall depend for the execution of its plans upon a permanent executive scientific staff. Any permanent research structure of national dimensions must, of course, have its foundations in the universities and technical schools. Unfortunately in this time of greatest need these institutions are seriously handicapped by the very generosity of their response to the demands already made upon them.

Scientific and Industrial Research

It is beginning to be recognized that there is no valid distinction between scientific research and industrial research. Both employ the same methods and the same equipment. The demands of either may involve and tax the highest intellectual faculties, and industrial research frequently necessitates that nicety of refinement and subtlety of attack which characterizes the highest scientific effort. Industry must, however, continue to look to the higher institutions of learning for the determination of fundamental facts and constants, the development of theory and the establishment of general principles.

The expanding recognition of the part which applied science is destined to play in our national development would seem to insure an adequate supply of scientific students and especially of candidates for degrees in chemistry and chemical engineering. Let us see to it at the start that they are provided with a broader culture than has heretofore obtained in many places, lest they be incapable as scholars of meeting their great responsibilities.

Bacon, for example, reports that 70 per cent of the directors of important industrial laboratories express dissatisfaction with the type of instruction which their assistants have received. They find the graduates coming to them ignorant of chemical literature and how to use it, lacking initiative, perspective and sense of proportion, failing in optimism, without knowledge of the simplest industrial equipment. Some of these deficiencies are obviously due to the drying up of inspiration at its source; to the displacement of the quickening influence of master minds by the cut-and-dried methods of pedagogy. Others, more easy of correction, result from inadequacies of the curriculum itself.

Plant Experimentation

Nothing is more expensive or demoralizing than experimentation in the plant. An industrial research laboratory should, therefore, be adequately provided with equipment of semi-commercial size. Infant mortality among processes is high in any case, and the most critical period in their young lives is that covering the transition from the laboratory to the plant. They require and the research laboratory should provide a nursery to protect and foster them during this period of their development. Some large manufacturers have even found it desirable to operate in connection with and under the sole direction of their research laboratory a small plant in which actual commercial manufacture is regularly conducted.

As regards any research laboratory, it goes without saying that it is the personal factor which determines performance and this is pre-eminently true of the laboratory director. Sir Humphrey Davy truly said that his greatest discovery was Michael Faraday, and no greater problem is likely to confront a research laboratory than that involved in the discovery of a director. Successful laboratory directors may be of several types, but a militant optimism, contagious enthusiasm, controlled imagination and quick human sympathy are common to them all.

Among laboratories thus constituted and directed, co-operation should not be difficult and is, in fact, already frequent. The real need of the situation is co-operation among manufacturers for the support of research. The long first steps in this direction have already been taken in Great Britain by the Advisory Council for Scientific and Industrial Research. In our

own country the National Canners Association has been signally successful in applying to research the principle of co-operation. Stimulating and encouraging as they are, we must, nevertheless, regard them only as surface indications of the great wealth of opportunity which lies below. There is hardly a trade association in the United States which might not to the great advantage and profit of its members address itself to the solution of common problems by similar means.

Those of us, therefore, who believe that every waste that is prevented or turned to profit, every specification which gives better control of raw material, every problem solved and every more effective process which is developed makes for better living in the material sense and for cleaner and more wholesome living in the higher sense, can render no more effective service than by aiding the American manufacturer to understand what research is, what it costs, why it pays.

Developments of Industrial Research

BY CHARLES L. REESE*

It is my purpose to present this contribution in the following phases:

To discuss the development and growth of industrial research as carried on by a large corporation, reviewing its history, and bringing the scope of the organization up to date.

To show some of the benefits derived by the maintenance of such an organization, and the appreciation shown by the corporation as evidenced by the free expenditure of larger amounts of money year by year and the establishment of additional laboratories all working on special lines.

To show the advantages of location in placing the laboratories for work along lines of special manufacture at or near the plant, rather than at the location of the general office.

To discuss research in various phases as follows:

Dr. Reese recounted the steps leading up to the adoption of a research laboratory in 1908, when $200,000 was expended for such work. He said that so great was the success of the venture that it has continued to expand until now the company has several such laboratories at various centers. Contrasting the expenditure in the first year, Dr. Reese stated that in 1918 not less than $2,000,000 would be spent for research work alone. In 1912 to 1915 his company spent $1,200,000 and effected a saving of $14,000,000.

This company, he stated, had found a way of obtaining potash from Chilean nitrate and had also developed a substitute for sheet lead, to say nothing about numerous discoveries and inventions in developing new products and raw materials for standard explosives. Ways have been found to neutralize former nitric acid losses amounting to 45,000,000 lb. per year. Synthetic toluene and picric acid are now possible and four new high explosives have been invented—all the product of research work.

In the dye industry alone research has made it possible to make in the United States all the important dyes.

Research in the Canning Industry

BY FRANK E. GORRELL†

The National Canners Association began to think of co-operation research about eight years ago. In 1910 there developed the need of having definite information regarding tin plate. To study this question an experimental pack was put up which was examined periodically by the Institute of Industrial Research and also by the Bureau of Chemistry and the Chemical Laboratory of the American Can Company. This investigation was completed in 1913. In the meantime the need of research along broader lines had developed and it was found desirable to have scientific men giving their entire time to the problems of the industry. The result was the organization of the Research Laboratories of the National Canners Association in the summer of 1913.

The problems these laboratories have studied in the main have related to difficulties of the canning industry. These difficulties are of the most diverse character. Among them are spoilage, faulty color of food, imperfections in the container and defective machinery. The ordinary operations of canning must sometimes be altered because of special conditions. The raw product occasionally has some characteristic (not noticeable when cooked in the kitchen) which necessitates special treatment when the product is canned.

These difficulties are only occasional. A plant may be operated for years without experiencing one of them. In one plant the cause of a certain difficulty may be obscure; in another, obvious. Most canning plants are small and are only operated for a few weeks of the year. A laboratory for each would be impracticable, wasteful and necessarily inefficient. On the other hand, a central laboratory is able to study these difficulties as they arise at one plant after another and thus sometimes get a broader view and reach more reliable conclusions than would be possible in a single plant.

In addition to the Research Laboratories just referred to, the canning industry maintains research work in connection with the inspection of canned foods. During the last two years three sections of the National Canners Association have put their plants under inspection, financed by them but controlled by the National Canners Association. This inspection is maintained for the purpose of controlling the character of the raw material and the sanitation of the plants, and considerable research work has been found necessary in connection with it.

For a long time food manufacturers have felt the need of an exhaustive study of food poisoning, more commonly known as "ptomaine poisoning." The canning industry decided to finance such an investigation, but experienced some difficulty in making arrangements to have it conducted under the most advantageous auspices. Finally, at the request of the National Canners Association, the National Research Council organized the investigation, naming as the director Dr. M. J. Rosenau, head of the Department of Preventive Medicine and Hygiene of Harvard Medical School, and also naming an Advisory Board consisting of six of the most eminent scientific men in the country. None of these men could have been secured for this investigation by the industry itself. They appreciated the importance of the study as a public measure, however, and accepted the invitation of the National Research Council to do the work.

As our work progresses the importance of research work is becoming more strongly impressed on our members. In the canning industry the individual plants are small and there are many general problems which can only be studied in a co-operative way.

Some Practical Views of Research

BY J. S. UNGER*

Twenty years ago industrial research was not as common in the steel business as it is to-day. At that time such research was not usually carried on by some one especially designated to do this work, but by the individual or joint efforts of the chemist, the engineer or the department superintendent of a plant.

I am in hearty agreement with the thought brought out by Dr. Howe. It should be the aim to carry out such tests as will approximate the trying conditions of service. This point is often lost sight of in making an investigation. The following examples will illustrate what I mean: A proof load test for a chain is better than a chemical analysis of the material and a hydrostatic test for a pipe or tube rather than a microscopic examination, etc.

It is foolish to investigate a subject by methods

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which cannot be commercially applied on account of their excessive cost, their interference with the preceding or subsequent operations and the uncertainty of their value when applied. For instance, the addition of ferromanganese in large lumps to the ladle will show a lower manganese loss, but cannot be recommended owing to the uncertainty of its thorough melting and distribution.

It may happen that objections may be raised to an experiment through apprehension that something may be developed which might be considered a criticism of works methods. At other times workmen may, through personal reasons, do great damage to the practical and successful use of a method or process by their stupid prejudice, or opposition. An investigation may show negative results, leading the management to condemn or stop further experiments along this or other lines. Negative results are valuable in showing what should not, or cannot, be done. There is a tendency in the shops to take too much for granted, particularly if printed, by believing some theory, or accepting as a fact a statement made by some one else, without requiring proof.

Research must be properly carried out. Many meritorious suggestions or experiments fail because they have been tried but once. Conclusions are best when based on a large number of results, rather than a few. Sometimes important features of the trial are omitted or carelessly executed. I have in mind a case where a trial tool was jammed and broken in a machine by the ignorance of the operator, who reported to his foreman that the tool was no good, and the experiment was stopped. As a result of the excellent performance of a similar tool at another plant, the tool was tried again about a year later and proved very successful.

In research work it is advisable to work with quantities approaching actual size as nearly as possible. To make a few ounces of metal in a crucible and afterward forge this metal into a specimen ½ in. in diameter, then heat-treat and test the material to show particularly high qualities, is neither impressive nor convincing evidence to one who must prepare a similar metal in 50-ton lots, cast it into ingots weighing several tons, roll it in a mill into pieces of 12 in. in diameter and later test the rolled material.

Many tests are regularly made which do not represent service conditions and can only be classed as checking or uniformity tests. Does it not appear absurd to test a cement briquette or a steel column by a tension test? Such tests have little practical value other than a check on the uniformity of the material. Do we not need to change many of our methods of testing to conform more closely to service conditions?

The essentials to successful Research Work are: An adequate and complete equipment, so as to be able to duplicate works conditions—if such is not possible, the use of the facilities of the works, the co-operation of the works management, foremen and men in an investigation, the creation of an optimistic and enthusiastic sentiment in solving works problems and the keeping of a careful record of the work done and the conclusions arrived at.

Research of greatest value to the steel industry is that careful study of things comparatively well known, to substitute facts for theories or beliefs, to promote desirable economies or improve qualities, and to distribute such information to those who may be able to use it in an intensely practical way.

Alfred D. Flinn, assistant secretary, National Research Council and secretary Engineering Foundation, discussed "Developments in Existing Agencies." The Engineering Foundation is co-operating with the National Research Council, he stated. He submitted a tentative list of the laboratories in the United States engaged wholly or partly in industrial research. It showed 350 such units.

The Quickwork Co., St. Mary's, Ohio, successor to H. Collier Smith, manufacturer of plate and sheet-metal working machinery, has opened an office in the Bourse Building, Philadelphia.

Cadmium in Brass for Cartridge Cases

Failure of cartridge cases by seasoning-cracking and splitting is due, according to the consensus of opinion among brass metallurgists, to the release of mechanical strains introduced during manufacture. Possibility of impurities, especially cadmium, as a contributory factor, is by them dismissed. Cartridge brass made from the highest grade, non-cadmiferous spelter is subject to season-cracking. Experiments with brass into which cadmium in varying amounts has been purposely introduced exhibit no increased tendency toward seasoning-cracking as compared with brass free from cadmium. There is some evidence to indicate that cadmium in brass may improve its mechanical properties; and the opinion is entertained by some brass metallurgists that some cadmium in spelter may be beneficial in brass manufacture. However, in making brass with spelter containing high cadmium, but little cadmium—not more than 0.02 per cent—is to be found in the brass, and its effect is regarded as inappreciable one way or another. The bulk of the cadmium is volatilized from the brass pot and is found largely in the flue dust therefrom. The entire subject of cadmium is practically ignored by the most experienced brassmakers. The influence of lead and iron in brass is well understood and these impurities are covered by precise specifications.

The French Government has supplied American contractors for cartridge disks with large quantities of spelter containing up to 0.4 per cent lead plus iron, without any specification as to cadmium. The British Government, which in the early years of the war, required high grade spelter, has recently liberalized its specifications and for cartridge brass now takes spelter containing up to 0.3 per cent lead and does not stipulate anything as to cadmium. American producers have supplied both of these governments, and also the Russian and Italian, with large quantities of such spelter, without receiving any complaint. If the manufacture of cartridge brass during the war had been limited to high grade spelter the supply would have been far from sufficient.

Finally, and most conclusively, the brass committee of the Advisory Council of National Defense, comprising the leading brass manufacturers of the United States, advised the United States Government that, with the use of spelter containing not more than 0.10 per cent to 0.12 per cent lead, 0.02 per cent iron, and up to 0.5 per cent cadmium, they could make good cartridge brass. They included brands of spelter refined by redistillation among those which they considered suitable. This recommendation by the brass committee is in itself considered a sufficient reason for the liberalizing of the spelter specifications of the United States, and by comparison with what the French and British are actually doing is regarded as being very conservative. Indeed, such spelter will make brass coming within the limits of toleration of impurities in the existing specifications of the ordnance department of the Army of the United States.

Portable Electric Wood Drilling Machine

A portable electric tool designed for drilling and countersinking small holes in wood has been brought out by the Wisconsin Electric Co., Racine, Wis. The machine operates at a high speed which is relied upon to prevent stalling, and holes up to 13/64 in. in diameter can be drilled and countersunk at any angle. The machine weighs 5 lb.

The International Nickel Co., 43 Exchange Place, New York, has completed the construction of its new nickel and copper works at Port Colborne, Ont. Effective July 3, production work has been inaugurated. The plant will have an annual capacity of about 20,000,000 pounds of refined nickel and 12,000,000 pounds of copper, and is said to be one of the largest works of its kind in the country. It represents an investment of about $3,000,000.

The Plant Viewed from the Railroad

PACIFIC ELECTRO METALS CO.

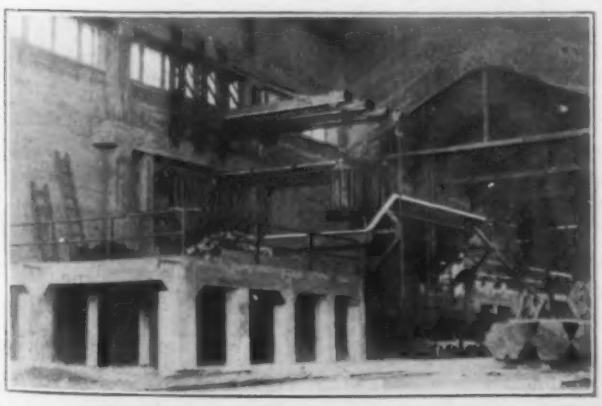
New California Enterprise Making Ferroalloys and Electrodes

It is a very natural development for the Pacific coast to become interested in electrometallurgy. The coastal regions, especially the California section, are highly mineralized, containing various ores suitable for reduction in the electric furnace. There are already developed, and there are still larger amounts of undeveloped, potential power available comparatively close to tidewater. The Pacific Electro Metals Co. is the result of these conditions and is a proof that the Pacific coast is gradually becoming awakened to the possibilities of new developments aside from mining and agriculture only—developments which are dependent exclusively on raw materials and conditions existing on the coast. The company is now operating a silico-manganese furnace and will in the very near future be operating another furnace making ferromanganese. Each of these furnaces has a capacity of 3000 kw. In addition, three 300-kw. furnaces are being installed in which ferronickel, ferromolybdenum, ferrochrome and ferrotungsten will be made as the raw materials are available.

The location of the company's plant at Bay Point, 30 miles east of San Francisco, is very accessible, having three railroads passing in front of the property, two of them, the Southern Pacific and the Santa Fe, transcontinental railroads; and the third, an electric railroad connecting with the Western Pacific. The plant has water frontage on San Francisco Bay also, which makes it possible for ocean-going vessels, if it is so desired, to bring it in touch with all parts of the world.

The main buildings are built of reinforced concrete. The main furnace building is a structure 120 ft. long, and 50 ft. wide. The transformer building is adjacent to the furnace building and is also built of reinforced concrete. The necessary cooling and packing rooms for the alloys, as well as machine shop, storeroom, washhouse, office, laboratory and gate house, are all placed in close proximity to the furnace building.

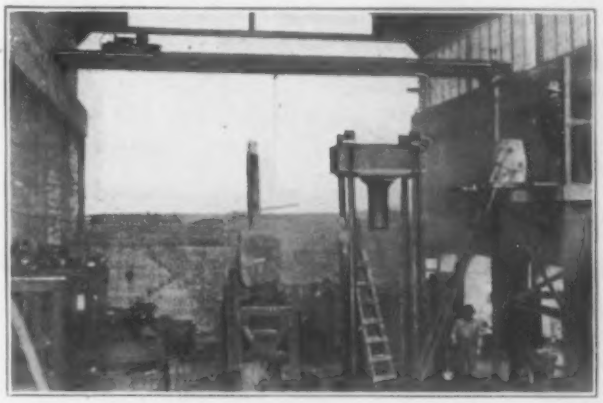
The electric furnace in which silico-manganese is made is a three-phase furnace with an open top. The raw materials are fed by shovel around the electrode and the metal is drawn from a tap hole at the bottom of the furnace. The operation of smelting is a continuous one. Electrodes used are 24 in. in diameter. The load factor of an electric furnace should always be good and the power factor, due to the careful interlacing of the leads, is also high. The transformer equipment for one furnace is composed of four single-phase 1000-kw. transformers, one of which is a spare.



One of the 3000-Kw. Shaft Electric Furnaces for Making Silico-Manganese

To make the plant self-contained and non-dependent on outside sources for electrodes, an electrode plant has been erected and local raw materials have been applied in their manufacture. This building is also of reinforced concrete and holds the necessary baking kiln and manufacturing apparatus for the electrodes.

There is ample room for developments on the property since it comprises 33 acres. The directors of the company are C. D. Clarke, San Francisco, president; J. M. Kroyer, Stockton, Cal., vice-president; Henry Koster, San Francisco, treasurer; C. F. Potter and J. W. Beckman, San Francisco. Exclusively western capital is represented in this undertaking. The plant



Interior of the Electrode Plant Where Electrodes, Made of a Mixture of Carbon and Graphite, Are Made

was designed by the Beckman & Linden Engineering Corporation of San Francisco, who are now the consulting engineers of the Pacific Electro Metals Co.

Post-War Problems of the Electrochemical Industry

The American Electrochemical Society is planning to devote one session of its fall meeting at Princeton, N. J., Sept. 29 to Oct. 1, to a consideration of the reconstruction and post-war problems of the industry. The status of all industries after the war is a most important question and deserves careful study at this time. This is especially true of many electrochemical industries which the demands of the war have stimulated to a point of expansion far beyond the requirements of peace.

Many of these industries, such as the chlorine and alkali industry, the ferroalloy industry, the manufacture of electric steel and the carbide industry have undergone an enormous expansion. One problem will be that of the disposition of government-owned plants. New uses in the arts of peace must be developed for the products of war plants. Most all of these questions of reconstruction and readjustment are pressing in view of the worldwide competition which will follow a declaration of peace. Other problems are the future of air nitrates, the electric power situation and research after the war in its varied university, Governmental and industrial phases.

A topic of far-reaching importance is the future relations of technical men to the affairs of government. Can the very important work of some of our technical boards be continued after the war and be made to function with the administrative and legislative branches of the Government?

British Columbia will export 5000 tons of manganese ore to the United States, under the permission of the Canadian Government. This ore will be used in the East, in plants now engaged in turning out munitions for the United States Government. It will be shipped from the Curle mine, near Kalso, B. C. The limit set is 5000 tons, though at the present moment that quantity is not available. At present the price at the mines is quoted at $25 per ton.

Wages Increase More than Living Cost

Investigation in Bridgeport Metalworkers' Strike Shows 78 Per Cent for the Former and 61.4 Per Cent for the Latter Since January, 1915

THOUGH living costs advanced 61.4 per cent from January, 1915, to June, 1918, in Bridgeport, Conn., wage advances more than kept pace, according to the report just completed by the statistical committee on wage conditions and cost of living created by the Manufacturers' Club of Bridgeport. The inquiry, as already explained in these columns, was due to issues raised in the Bridgeport metal trades strikes and the committee made an exhaustive study of local industrial conditions. The following facts are disclosed:

The cost of living has increased 61.4 per cent.

Nominal hourly wage rates have increased 72 per cent.

Weekly earnings in general have increased 81 per cent.

Hourly earnings in general have increased 78.5 per cent.

Weekly earnings of male workers have increased 78 per cent.

Hourly earnings of male workers have increased 72 per cent.

Weekly earnings of female workers have increased 87 per cent.

Hourly earnings of female workers have increased 99.4 per cent.

Hours of labor in general have increased 1.8 per cent.

Hours of labor of male workers have increased 3.6 per cent.

Hours of labor of female workers have *decreased* 6.5 per cent.

No person residing in Bridgeport or attached to any Bridgeport industry was a member of the statistical committee and no compensation in any form was paid except that in some cases the investigators were reimbursed for hotel and traveling expenses. All reports submitted by Bridgeport employers were accompanied by affidavits signed by responsible executives and these reports were audited, the auditors likewise making affidavits of the accuracy of the work they performed. Each person charged with the compilation of tabulations and the drafting of graphic charts has filed an affidavit of the verification and correctness of such tabulations and charts.

Data Go to War Labor Board

All of the data obtained will be submitted to the National War Labor Board to assist it in the adjudication of the Bridgeport labor dispute. In gathering its data the committee found that it faced almost insurmountable complexities. The various kinds of labor are not clearly classified even in a single factory and this difficulty was multiplied as the factories drawn into the investigation grew in number, with consequent increase in variety of products manufactured. The committee found a decided lack of definition and uniformity in the nomenclature by which the different kinds of labor were described. There was a wide divergence in the use of the same term in various factories; or, in other words, a wide difference in the functions of men given the same occupational title. Early in the investigation it was made plain that there was great diversity in the methods by which the payroll items were gathered. The committee therefore investigated not only the nominal rates of pay, but also the actual earnings which constitute the income from which the increase in the cost of living is met, rejecting, however, from consideration all deferred or contingent bonuses which did not appear as definite payroll items.

In determining the advance in the cost of living the committee took only the four items—food, housing, fuel and light and "other." The assumption was that the balance of expenditures denoted by "other" has undergone the same percentage increase as the total of the first three items. A similar assumption was made in the April monthly review of the Bureau of Labor Statistics. In computing the advance in food costs the committee took a report published by the *Annalist* of New York as a guide. This report showed higher costs of 25 foods at wholesale in the New York and Chicago markets. During the period under consideration food costs advanced 76 per cent, housing costs 32.5 per cent, coal costs 65 per cent, light costs, 10 per cent for gas and 7.1 per cent for electricity—an average fuel and light increase of 39.6 per cent. These items averaged show an advance in living costs of 61.4 per cent. Food, housing and fuel and light represent together 64.9 per cent of the total expenditures of families in Bridgeport.

Subsequent to the compiling of the data on rents, additional information was received from the Remington Arms Co., from the American Chain Co. and from W. E. Burton, Legal Aid attorney of Bridgeport. The combined figures from these three sources, applying to 280 families, show a rental increase of approximately 38 per cent, representing in the case of the Remington and Legal Aid lists the more flagrant cases which have been individually investigated. Consequently the average increase of 32.5 per cent. for the 979 families whose housing costs were investigated by the committee is apparently representative of general conditions.

The Wage Comparison of 1915-1918

The investigation into wage conditions had for its object "the determination in the most accurate manner possible, within the limited time available, of the actual situation with respect to the earnings of industrial workers in Bridgeport, and the making of a true and representative comparison as between conditions in the early part of 1915 and the conditions existing at present."

The week ending Jan. 16, 1915, and the week ending June 22, 1918, were taken for comparison. The June week was the latest full week following the recent walkout.

It was necessary to determine the factories in which the investigation should be made. It was first proposed to take in all of the factories in the city, numbering approximately 185, but it was found that an investigation as complete as this would consume much more time than was available. It was therefore decided to cover all concerns that have been parties to the recent disagreement with their employees, excepting only such as have come into existence so recently that a comparison with 1915 would be impossible. In order that the industries included might be sufficiently represented, both as to types of occupation and as to methods of employment and reimbursement, several additional concerns were investigated.

The total number of companies included in the inquiry is 23 as follows:

American & British Mfg. Co.
American Chain Co.
American Tube & Stamping Co.
Ashcroft Mfg. Co.
Automatic Machine Co.
Bilton Machine Tool Co.
F. G. Breul
Bridgeport Brass Co.
Bridgeport Die & Machine Co.
Bridgeport Hardware Mfg. Co.
Bryant Electric Co.
Bullard Machine Tool Co.
Columbia Graphophone Co.
Connecticut Electric Mfg. Co.
Harris Engineering Co.
Lindstrom Die Tool & Gauge Co.
Locomobile Co.
Nilson Machine Co.
Precision Gauge & Tool Co.
Remington Arms Co.
Remington U. M. C. Co.
Singer Mfg. Co.
F. S. Trumbull Co.

The total number of shop employees in these concerns as of June, 1918, is 33,999, of whom approximately 29,500 are males. The total number of industrial workers in Bridgeport is approximately 54,000 of whom approximately 42,000 are males. This investigation thus represents about 63 per cent of the total industrial employment of the city, and about 70 per cent of the male workers.

Thirty-three Classes of Workers

It was necessary to decide upon some method of analysis of the various kinds of labor involved, in order that it might be possible to draw general averages for the various concerns as well as specific averages for each concern. Inasmuch as each industrial concern in the city has its own classification of labor, and as these various classifications are in many instances exceedingly complex, it was obviously impossible for the committee to adopt the classification in use in the various concerns and derive therefrom common data which could serve as a basis for comparison. It was believed, however, that out of the various kinds of labor in use a sufficient number of occupations could be selected, the commonly accepted definitions of which would be reasonably uniform in the various industries, so that this selected list of occupations, while by no means inclusive, might be taken as a fair and correct basis for the determination of conditions throughout the range of industrial occupations in the city. The following 33 occupations make up the barometer list:

1. Gagemakers
2. Die sinkers
3. Toolmakers
4. Machinists
5. Lathe operators
6. Planer operators
7. Precision grinders
8. Milling machine operators
9. Automatic screw machine operators
10. Hand screw machine operators
11. Blacksmiths
12. Blacksmiths' helpers
13. Machine shop filers and fitters.
14. Drill press operators
15. Shaper operators
16. Machine set-up men
17. Molders
18. Coremakers
19. Drop forgers
20. Patternmakers
21. Polishers
22. Millwrights
23. Millwrights' helpers
24. Carpenters
25. Carpenters' helpers
26. Pipers
27. Pipers' helpers
28. Painters
29. Common laborers
30. Electricians
31. Electricians' helpers
32. Women machine operators
33. Women inspectors

In making up this barometer list the committee aimed to have it as representative as possible. Occupations which were variously defined in the several industries were excluded to avoid confusion of results. Occupations in which the number of workers was very small were excluded in order to simplify the investigation in the interest of time. Care was taken by the committee to include such occupations as would insure the representative nature of the investigation from the standpoint of the kind of labor, degree of skill, or rate of pay. To avoid false results due to the very recent extensive employment of female labor, only male workers were included in the barometer occupations, except as to two classes, namely 32 and 33, which were included as barometer occupations for female labor. These are the two most important classes of female labor from the standpoint of numbers employed.

The total number of workers reported on under the barometer classification is 10,476 (June, 1918) out of a total of 33,999 shop workers in the concerns included within the investigation, or 31 per cent, and out of a total of approximately 54,000 industrial workers in the city, or 19½ per cent. The committee says in its report: "While the percentage of 31, as obtained by the barometer list of occupations, is ample as an index of conditions, it justifies also the investigators' decision that such a barometer list would provide the only practicable means of obtaining comparable data."

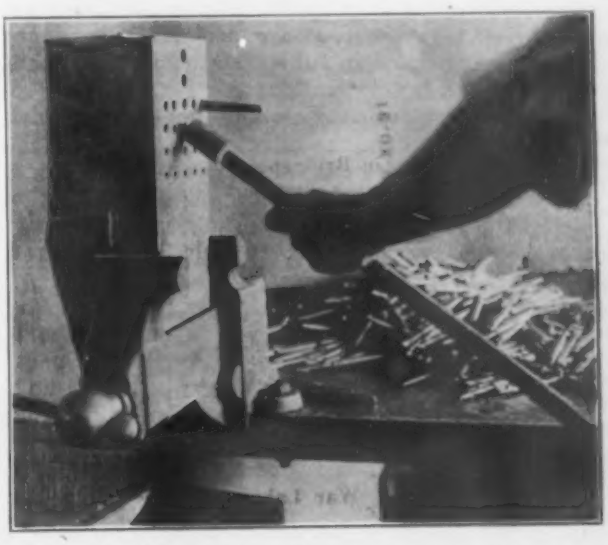
Careful Checking of Data

To insure a correct understanding of the requirements in collecting the data and to insure also a uniformity of effort, representatives of all of the concerns involved in the inquiry met collectively with the investigators and received a full explanation of the nature of the inquiry. They were impressed with the fact that the purpose of the investigation was to make a correct and impartial comparison of the earnings of the workers as between 1915 and 1918, and that their work would be subjected to an independent and impartial audit to insure that this purpose was achieved. During the progress of the work of collecting data an information bureau was maintained under the control of the investigators for the purpose of answering questions and insuring a common basis of work.

A force of 17 accountants conversant with factory payrolls was called in from cities other than Bridgeport to conduct an independent audit of the reports, the committee taking this means of insuring the correctness of the data and to guard against any possible attempt, either intentional or unintentional, to color the data. These accountants came to Bridgeport without knowledge of the controversy other than such as they would gain by hearsay or through the newspapers and without interest therein. They were placed under the direction of a competent general auditor, also from outside Bridgeport, and were called upon to make a careful audit of the work at each of the companies involved in the investigation. The audit occupied two days and included not only reference to original payroll and other records, and checking of working papers and arithmetical work, but also the examination of underlying facts affecting the uniformity of the data and of adherence to the expressed purpose of the investigation.

Safety Device for Breaking Drills

The Ford Motor Co., Detroit, is employing a simple device to protect the men employed in breaking up hard drills, or other brittle or high-speed scrap metal. As



Breaking Worn-Out Steel Drills to Separate the Lower Portion Which Is of High-Speed Steel from the Softer Shank Is Safely Accomplished by Using the Device Illustrated

these drills are made of two kinds of steel, high-speed for the lower portion and a softer grade for the shank, it is desirable to keep the two kinds of steel separate.

The device used consists of a boxlike section with a front member of ¾-in. metal having holes of various diameters drilled in it. In use this section is placed in a vise and the drills which are to be broken put in the holes. When a piece of pipe is slipped over the projecting end and a slight pressure applied, the drill is broken, one half going down through the pipe and falling into a box or other receptacle at the operator's feet, while the other part is pulled through and dropped into another box. In this way, any likelihood of injury, due to flying bits of steel following the fracture, is found to be eliminated.

Operations at the Sharon, Pa., plant, National Malleable Castings Co., have been resumed after a shutdown of 10 days for Fourth of July celebration and the taking of the annual invoice.

The Testing of Aluminum Sheets

Softening Cold-Rolled Sheets by Exceedingly Short Time Exposures at Various Temperatures—Better Drawing Properties — Effect of Over-Annealing

BY ROBERT J. ANDERSON

IN an earlier article* there was given an account of Erichsen tests made on annealed 18-gage aluminum sheets, and in the present article data are presented on the annealing of similar 14-gage sheet aluminum. The 18-gage sheets, discussed in the previous article, had been reduced about 83 per cent in the cold, while the 14-gage sheets had been reduced about 72 per cent.

It has been shown in another place† how the effects of heat become earlier apparent on cold-rolled aluminum sheets with increasing percentages of reduction; in the present discussion there is introduced a brief account of the first attempts made by the writer to soften cold-rolled aluminum sheets by exceedingly short-time exposures at various temperatures.

Referring to the annealing of cold-rolled aluminum sheet in general, it may be said that the usual practice calls for a rather prolonged exposure at a moderate temperature, 18 to 30 hr., at 375 deg. C., irrespective of the gage, or what is equivalent to the same thing, the percentage of reduction in the cold. The opinion has been advanced by the writer, and experimental evidence has been submitted to substantiate the belief, that such practice is totally disproportionate to the requirements for annealing aluminum sheets which are to be worked in the draw press.

Cold-rolled aluminum sheets can be annealed, as evidenced by the scleroscopic drop of from 13-15 to 4-5 Shore hardness number by relatively abbreviated exposures at various temperatures, and sheet so annealed gives a better performance in the draw press than similar metal annealed by very much longer exposures at the same temperatures. Commercially it is, or should be, of paramount importance to effect the anneal as rapidly as possible. When stating that an aluminum sheet is annealed, it is understood that the Shore hardness is 4 to 5, since sheets having this degree of hardness are as soft as they ever will be, or practically so, although instances have been found where the Shore hardness was as low as 3.5.

Effect of Over-Annealing

In a certain drawing operation employing 14-gage annealed aluminum blanks for the production of a specific shape, a great deal of scrap was produced through rupture of the metal in the press, and apparently because of the weakened condition of the sheets arising from over-annealing. The aluminum sheets in question were of high-grade metal; the sheets had been rolled from ingots cast from a virgin melt which analyzed over 99 per cent aluminum, and with the usual impurities iron, silicon, copper and manganese in subordinate amounts. The annealing had been conducted by exposing the blanks for 24 hr. at 370 deg. C. Samples were procured from the 14-gage sheet blanks which had been giving difficulty in the draw press, and a few of the test results are given in Table 1.

An inspection of the fractured domes of the Erichsen test pieces showed that the metal was totally unfit for drawing, while the values in Table 1 and microscopic examination indicated that the various samples were similar as to physical properties. The microscopic examination of the internal structure gave evidence that the metal had been over-annealed, as was shown by the unusually coarse grain structure. As is well known, prolonged annealing causes coarsening of the grains in previously cold-worked metals, and coarse-grained metals do not possess so high strength and ductility as similar fine-grained metals.

Table 1.—Erichsen and Scleroscope Values for Annealed Aluminum Sheets, 14-Gage, Exposed for 25 Hr. at 370 Deg. C.

Sample Marked	Shore Hardness, Number	Erichsen Values: Thickness, Millimeters	Erichsen Values: Indentation, Millimeters	Appearance of Domes
1	4.5	1.65	10.66	Coarse
2	4.8	1.66	10.41	Coarse
3	4.5	1.66	10.56	Coarse

Note—The values given represent the mean of two closely agreeing determinations.

In the mill manufacture of the 14-gage sheets under discussion, the metal passed through stages as follows: An aluminum ingot, cast at a temperature of about 800 deg. C., was heated for approximately 6 hr. at 450 deg. C., and was then broken down hot to a 0.25-in. slab with five or six passes in a two-high hot mill. The resultant slab was then slabbed cold to 0.125-in. thick, and this thinner slab was finished cold to 14-gage by a series of passes in a finishing mill. The resultant 14-gage sheets were then cut into blanks, and these were annealed as mentioned in the preceding paragraph.

In order to demonstrate roughly that much less time is required for annealing (this being considered accomplished from the mill standpoint by a scleroscopic drop of from Shore hardness number 14-15 to 4-5), a number of samples of cold-rolled 14-gage aluminum sheets, reduced 72 per cent, were exposed for 2 hr. at 400 deg. C. Forty blanks so annealed were drawn in the draw press, and all of them successfully withstood the draw. The results of a few tests, made on samples annealed in this way, for hardness and ductility, are shown in Table 2. The indentation values are not greatly different than those where the same metal was ex-

Table 2.—Effect of Annealing 14-Gage Aluminum Sheets; Time Constant at 2 Hr., and Temperature Constant at 400 Deg. C.

Sample Marked	Shore Hardness, Number	Erichsen Values: Thickness, Millimeters	Erichsen Values: Indentation, Millimeters	Appearance of Domes
4	4.5	1.66	10.40	Smooth
5	4.7	1.65	10.68	Smooth
6	4.5	1.66	10.83	Smooth
7	4.8	1.66	10.72	Smooth

Note—These annealings were conducted in a large mill furnace; the end of the thermocouple was 2 ft. from the samples, so that the temperature given should be regarded with this provision.

*Erichsen Tests on Aluminum Sheets, THE IRON AGE, April 11, 1918, pp. 950-951.

†Annealing and Recrystallization of Cold-Rolled Aluminum Sheet, *Met. and Chem. Eng.*, Vol. 18, No. 10, May 15, 1918, pp. 523-527.

posed for 24 hr. at 370 deg. C., but the fractured domes of the Erichsen test pieces were smooth, indicating good drawing quality. Microscopic examination showed that the grains were fairly small.

Short Time Annealing

Some annealing experiments were performed with the attempt to soften the 14-gage cold-rolled sheets by means of relatively short exposures at various temperatures. The indentatiton and hardness values for three-minute expostures at temperatures varying from 200 to 600 deg C. are recorded in Table 3. These annealing tests were

Table 3.—Effect of Annealing 14-Gage Aluminum Sheets; Time Constant at 3 Min., and Temperature Variable

Sample Marked	Temperature, Deg. Cent.	Shore Hardness, Number	Erichsen Values: Thickness, Millimeters	Erichsen Values: Indentation, Millimeters
1	200	15.0	1.57	7.90
2	250	14.0	1.57	8.60
3	300	14.0	1.58	8.75
4	350	13.0	1.59	8.93
5	400	12.0	1.58	9.09
6	450	9.0	1.58	9.52
7	475	5.5	1.58	10.05
8	490	5.5	1.57	10.70
9	500	4.5	1.57	10.64
10	550	4.5	1.58	11.00
11	600	4.5	1.57	11.10

performed in a laboratory electric furnace of the resistance type, and the temperatures given are accurate within ± 10 deg. C. The Shore scleroscope values in Table 2 show that the 14-gage sheets are practically as soft as they ever will be after an exposure of three minutes at 500 deg. C. Samples annealed at 500 deg. C. were, in this series of tests, practically free from blisters, but this is not invariably so.

Fig. 1 gives curve plots showing temperature-indentation and temperature-hardness curves for 14-gage cold-rolled sheets after exposing at the

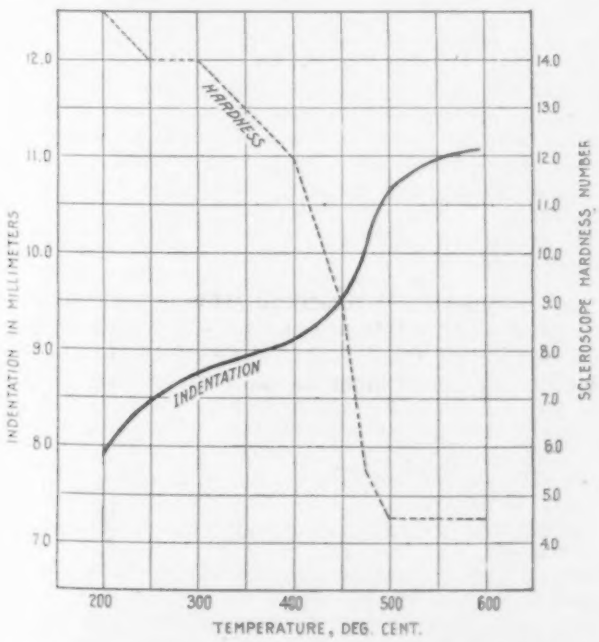


Fig. 1.—Temperature-Indentation and Temperature-Hardness Curves for 14-Gage Aluminum Sheets Exposed for Three Min.

temperatures indicated for three minutes. The scleroscopic hardness falls off rapidly with increasing temperature, and the indentation increases gradually to a maximum attained by the exposure at the highest temperature employed. Beyond 600 deg. C. it is not wise to conduct annealing, since we get into the range of incipient melting; aluminum freezes over a fairly long range, it appears.

The preliminary short-time annealing experiments showed that 14-gage cold-rolled aluminum sheets could be softened to 4-5 Shore scleroscope hardness number by three-minute exposures at temperatures of 500 deg. C. and above. In order to secure further data, and also to demonstrate on the mill scale that this metal after relatively short exposures could be drawn in the draw press, 80 cold-rolled blanks with accompanying smaller samples for test purposes were annealed as indicated in Table 4. In the table each sample tested is representative of 10 blanks which were subsequently drawn in the draw press, with the exception of those represented by sample 12 which were too hard. The blanks represented by samples 13 to 19 gave test data which indicated that they should draw well in the draw press.

The data recorded in Table 4 show that softening, so far as required by practice, can be effected for cold-rolled 14-gage aluminum sheets by an ex-

Table 4.—Effect of Annealing 14-Gage Aluminum Sheets, Time Variable, and Temperature Constant at 450 Deg. Cent.

Sample Marked	Time in Minutes	Shore Hardness, Number	Erichsen Values: Thickness, Millimeters	Erichsen Values: Indentation, Millimeters
12	4	9.5	1.58	9.68
13	8	4.5	1.57	11.91
14	15	5.0	1.57	11.68
15	20	4.5	1.58	11.48
16	25	4.5	1.59	11.20
17	35	4.5	1.58	11.21
18	55	4.0	1.59	10.96
19	60	4.0	1.57	11.07

posure of as little as eight minutes at 450 deg. C., and the results in Table 3 have shown that it can be accomplished in three minutes at 500 deg. C. The blanks annealed as shown in Table 4, with the exception of those represented by sample 12, were drawn into a given shape in the draw press using the regular drawing operation. Every blank was successfully drawn.

It is interesting to note that the deepest indentation value secured by the annealing tests recorded in Table 4 was for sample 13, which had been exposed for eight minutes. With longer ex-

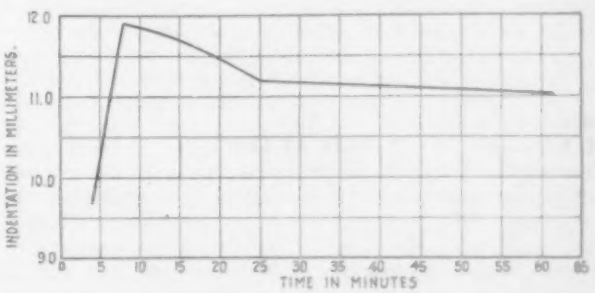


Fig. 2.—Time-Indentation Curve for 14-Gage Aluminum Sheets at 450 Deg. C.

posures at the same temperature the identations are less deep, and this is not to be totally unexpected. Fig. 2 is a curve plot showing the time-indentatiton curve for this 14-gage aluminum sheets exposed for various times at 450 deg. Cent.

The Atlas Crucible Co., Dunkirk, N. Y., formerly represented in Detroit by George H. Marvin & Sons, 253 East Jefferson Avenue, has taken over the agency, and it is now a regular Atlas branch. George H. Marvin continues with the Atlas company as its Detroit and Michigan sales representative. Harold D. Stroud, formerly of Buffalo, is the mill representative co-operating with Mr. Marvin in the conduct of the Detroit branch, and directly in charge of the office and warehouse.

Planning to Conserve Tin Plate Supply

Manufacturers and Users of Tin Cans Confer with War Industries Board — Sheets May Be Used Extensively as a Substitute

WASHINGTON, July 16.—Manufacturers and users of tin cans have been summoned to Washington for a series of conferences with the War Industries Board looking to the conservation of tin plate by the substitution of other materials in the manufacture of containers for other than food products. The movement to husband tin plate, the details of which are being worked out by the conservation division of the board, is intended to establish a basis that will serve throughout the war, although it is probable that there will be some relaxation after the canning season is over in such restrictions as may be adopted as the result of the survey now on foot.

The first of the tin plate conferences was held during the past week and was attended by officials of the principal can manufacturing companies and by manufacturers of tobacco and certain other products heretofore packed in tin containers. As the result of the meetings, it now seems probable that a large tonnage of black plate of very light gage will be substituted for tin plate, and that considerable quantities will be exported in place of the large amounts of tin plate now being shipped to foreign countries at the rate of more than 35,000 tons per month. Although the pig tin employed in the manufacture of tin plate constitutes a little less than 2 per cent of the finished product, the present consumption of tin for the manufacture of plate amounts to nearly 30,000 tons per annum, or nearly half the estimated pig tin supply for the coming year. The consumption of tin for this purpose, therefore, is relatively so important that every possible effort will be made to compel the use of substitutes where it is at all practicable to do so.

Samples of Cans Made of Sheets

At the suggestion of the conservation division, the manufacturers present at the recent conference submitted samples of cans of black steel sheets as substitutes for tin plate containers. The sheet used was somewhat lighter in gage than the tin plate previously employed for the same purpose and was protected from rusting by a thin coat of lacquer. For certain purposes these containers were pronounced to be entirely satisfactory, but objection was made by the manufacturers of tobacco and other products that the lacquer imparts to the container a characteristic odor which might be conveyed to the contents, detracting from their quality. In the case of certain containers made of black plate covered with lacquer, the inside of the cans showed evidences of rust, but the can makers suggested that this was due to the fact that the sheet was lacquered before the cans were made, which rendered it impossible to fully protect the seams. It was thought that rusting could be entirely prevented by treating the completed can to a coat of lacquer. Certain of the sample cans exhibited at the conference were decorated, lithographed, etc., quite as effectively as has been possible with tin cans.

It is unlikely that any material saving in tonnage of pig tin will be made during the present year, as the result of the substitution of black sheets, for the reason that manufacturers employing tin containers wish to test the new material very thoroughly before adopting it. Certain manufacturers are very sure that black sheets cannot be employed for the tops and bottoms of cans and insist that tin plate must be used for this purpose, although it is believed that sheets will serve fairly well for the bodies of the containers. It is understood that the conservation division will allow the manufacturers 60 to 90 days in which to make exhaustive tests to determine the practicability of the use of sheets.

A very important use of tin, which is said to call for at least 4000 tons per annum, is the manufacture of collapsible tubes which are used as containers for a large variety of articles. While these containers are small, the consumption of tin in their manufacture is relatively large not only because of the great number of articles packed therein but also because the tubes are made of practically pure tin. There has been some curtailment of the use of tin for this purpose as the result of the increase in price which, during the past two years, has gone up from about 25 cents to approximately $1 per pound. Various substances are now being employed, not in the manufacture of collapsible tubes, for which no other metal appears to be satisfactory, but in the production of cans, jars, bottles, etc., in which certain products heretofore packed in tubes are now being put up.

In the effort to save as much as possible of the 4000 tons of tin now being used in the manufacture of collapsible tubes the tin section of the conservation division is sending out a questionnaire to all users of these tubes asking for detailed information as to present methods and possible changes.

May Save Large Tonnage

On the basis of a total consumption of about 78,000 gross tons of pig tin the conservation division hopes to save at least 20,000 tons. During the calendar year 1917 the consumption of pig tin was as follows: For tin and terne plate, 27,600 tons; solder, 17,000 tons; babbitt and other bearing metals, 10,800 tons; brass and bronze, 4800 tons; foil, 4000 tons; collapsible tubes, 4000 tons; white metal, 1764 tons, and miscellaneous, 8000 tons. Plans already made insure the reduction of at least 25 per cent in the consumption of tin in the manufacture of solder, babbitt and other bearing metals, and in the manufacture of brass and bronze. At least one-half the total amount heretofore used in the manufacture of tin foil will be saved as the result of the complete elimination of this material in the wrapping of various commodities for which paraffined paper will be employed. The general substitution of black sheets for tin plate for containers for other than food products, it is hoped, will cut down the use of tin for this purpose by 5000 or 6000 tons. A substantial saving will probably also be made in the miscellaneous uses of tin.

The British Policy

Considerable pressure is being exerted by the British Government, which is practically rationing this Government on tin, to bring the tin conservation practice of this country more nearly into accord with that of Great Britain where the most drastic regulations are in force involving the total prohibition of the use of new tin plate for many purposes which, in this country, would be regarded as essential. The Department of Commerce is in receipt of a report from the commercial attaché of the American embassy in London transmitting figures obtained from the British foreign office showing savings effected in the use of tin plate for containers through the employment of salvaged scrap. A striking comparison is presented in these figures between the consumption of tin plate for various purposes during 1913, the last calendar year before the war, and the allotment for the year 1918. These statistics include the following items:

Biscuit tins. In 1913 the trade used 12,000 tons. This year they have had so far 515 tons. For the rest they have to use old tins or go without.

Boot polish, etc. In 1913, 6,000 tons were used. This year none has been allotted to them so far. They have to work up scrap tin sent back from the front in France.

Tobacco. The trade wants about 16,000 tons a year. This year none has been allotted so far for civilian trade. They are living on old stocks.

Domestic tinware. For this 8,000 tons were used in 1913. At present they are only allotted 750 tons a quarter.

Paint, color, and varnish. In 1913, 4,380 tons were used in this trade. So far this year they have received 400 tons.

Printing ink. In 1913 the trade used 237 tons. This year they have so far received 31 tons.

It will be noted that while the United States not only permits tin plate to be used for all food containers but also to be exported for the manufacture of such containers abroad, the British Government, for the current year, has allowed the manufacturers of biscuits only 4 per cent of their normal requirement.

Foreign Commerce

The foreign trade figures showing the imports of tin and exports of tin plate are causing the War Industries Board considerable anxiety. For the month of May imports of tin in bars, blocks, pigs, etc., amounted to but 4819 gross tons as compared with 6825 tons for the same month of 1917. During May of this year, the exports of tin plate aggregated 37,350 gross tons as against 23,283 tons for the same month a year ago. The decline in the imports of pig tin during May is further emphasized by the figures for the 11 months ended May, which show total importations of 54,086 gross tons as compared with 53,049 tons for the same period of 1917. Of course, this increase in imports for the 11 months taken in connection with the marked decrease in May reflects a rapid progressive decline from the high levels of the first half of the last fiscal year.

The recent rapid increase in exports of tin plate is causing much comment among domestic consumers of this product who are at a loss to understand why the Government, which controls these shipments by the strictest kind of a license system, should permit such large exportations at a time when the War Industries Board is doing everything in its power to reduce the consumption of pig tin. Exports of tin plate show a 60 per cent gain in May of this year over the same month a year ago, although the gain for the 11 months ended May as compared with the corresponding period of 1917 is less than 7 per cent.

An examination of the list of countries to which shipments are now being made affords some explanation of this anomalous condition. Nearly 20 per cent of our total shipments of tin plate are now going to Canada, where they are largely used in the manufacture of cans for food containers. A similar quantity is being shipped to Japan under War Trade Board licenses predicated on a variety of concessions having a reciprocal trade basis and indirectly related to the furnishing of tonnage by Japan for the transatlantic trade. Substantial amounts of plate are also being shipped to Brazil, Argentina and Uruguay to be used as containers for beef intended to be shipped to the allied forces in France and England. It will be seen, therefore, that a very large proportion of the tin plate now being exported is simply being sent to countries where it will be used in the manufacture of containers for food for the allied armies. The War Trade Board freely grants licenses for tin destined for almost any allied or neutral country if intended for such a purpose.

W. L. C.

New Installations of Snyder Electric Furnaces

Two single-phase Snyder electric furnaces, to be operated together on a polyphase current system, are being installed at the plant of the Western Steel Car & Foundry Co., at Hegewisch, Chicago. These two furnaces, built by the Industrial Electric Furnace Co., Chicago, are each of one and one-half tons capacity. They are designed for acid operation on steel castings, and unusually good results are expected from this method of operating single-phase furnaces on a polyphase system.

Labor difficulties affecting about 200 machinists employed by the Steinle Turret Machine Co., Madison, Wis., were settled without appreciable interruption of operations through the mediation of a Government labor conciliator.

Patternmakers' Motor-Head Face Lathe

An alternating-current patternmakers' face lathe which is an entirely self-contained unit has been brought out by the Oliver Machinery Co., Grand Rapids, Mich. While this lathe equipped with a direct-current motor has been on the market for some time, it is only lately that it has been fitted for alternating-current power. Aside from having all parts entirely inclosed, thus guarding against the entrance of the dust, the lathe is readily portable, as the controller and the rests for the tools used are mounted on the floor column.

The Speed Control in a Patternmakers' Alternating-Current Motor Head Face Lathe Is Secured by the Two Handwheels Which Govern a Self-Contained Controller

The motor employed is of the single-phase, series-compensated type and will operate at speeds ranging from 800 to 3500 r.p.m., the control being obtained by handwheels which govern a self-contained controller. The motor can also be used on any single or polyphase circuit of the proper voltage and will operate on any frequency of from 25 to 60 cycles. The wiring from the main line to the motor is only two wires.

The lathe spindle is of steel tubing 1¼ in. in diameter and has a 1½-in. hole extending through its entire length to facilitate the removal of centers. The inner end is threaded to receive faceplates and bored for No. 2 Morse taper shanks, while the outside end has a handwheel for holding the spindle while faceplates are being removed, turning the spindle by hand when making adjustments or for stopping the motor quickly. If desired the handwheel may be replaced by a faceplate when rear end turning is desired. The lathe has a swing of 24 in. over the bracket and 20 in. over the rest socket, thus enabling it to turn work up to 12 in. in width and 20 in. in diameter or 6 in. in width and 24 in. in diameter.

Ford Plant at Windsor, Can., Closed

TORONTO, ONT., July 15.—Notices posted in the plant department of the Ford Motor Co., of Canada, Windsor, July 6, informed the employes that it had been decided to close the factory indefinitely. No reason for the shut-down was given. The announcement, however, created no surprise in certain quarters, because it has been an open secret that labor troubles, together with the increasing difficulty in procuring materials promptly, have made the matter of keeping a full force at work rather a difficult one. Demands made by the workmen last week for a sharp increase in wages to 62½ cents an hr., with a minimum of $5 for an 8-hr. day, appear to have brought the question to a culmination, which turns out unfavorably for the men. Between 700 and 800 employes are affected by the closing of the plant. In addition, the Kelsey Wheel Co., the Dominion Stamping Co., and the Fisher Body Co., which have been working on Ford orders will also be affected by the cancellation of orders.

The Erie Steel Construction Co., Erie, Pa., which is now engaged in building cranes, has appointed the A. D. Granger Co., 13 Park Row, New York, its Eastern representative.

Slag as an Aggregate for Concrete Ships

Comparison Made to Crushed Stone or Pebble Concretes Puts Slag in Place of Superiority

BY CURTIS C. MYERS*

THE information and data used in writing this article have been obtained from research and experimental work carried on during the past year and a half at the University of Cincinnati, with the main purpose of comparing blast furnace slag with other aggregates used in concrete construction. During this period of experiment and testing many interesting details have been developed and some of these problems have been worked out more completely than it was originally intended.

Of these problems, which have been of particular interest to the writer, the problem of concrete ship construction has been specially studied, and many efforts have been made to determine from outside sources, particularly from the builders of concrete boats, the grading of materials and the method of mixing and placing the concrete used in this type of work. Very little specific information has been available. It is hoped, therefore, that the data presented in this article will have some bearing on the ship-construction problem, and at least prompt further discussion, or suggest a more complete series of tests, for the purpose of determining the best proportions and the kinds of materials to be used for this new and important type of structure.

Compressive Strength

Compressive strength tests of slag concrete and crushed stone concrete were made of 1:2:4 mixtures. At the end of six months the slag concrete, on the average of three breaks, had a strength of 3520 lb. per sq. in. compared to 2910 lb. for the crushed stone concrete. These results indicate 21.3 per cent greater strength for the slag concrete. At the end of a year the slag concrete had increased in strength until it was 27 per cent stronger than the crushed stone concrete.

In Fig. 1 are shown three compression cylinders. The breaks are typical of the materials and indicate their behavior under stress. The slag specimen failed in a long, clean fracture—the two main portions remaining sound with only minor cracks. The broken material has a ring when tapped with a hammer. The section of slag at the left of the cylinder shows a fractured surface with practically all of the coarse aggregate broken through, hardly a piece having pulled away from the mortar. In contrast with these, the specimens of pebble concrete and crushed stone concrete in this same illustration show an entirely different failure. The portions of the original cylinders remaining intact are badly cracked and may be readily pulled apart. The broken surfaces show a large proportion of pebbles which have pulled away from the mortar. This is also very apparent in the crushed stone cylinder.

Arguing from the results of these tests, it would seem that any load great enough to cause major cracks to develop in a structure would damage slag concrete less than it would crushed stone concrete. For instance, a reinforced crushed stone concrete structure which has been loaded to a point developing major cracks is full of minor cracks, making the whole mass of little value as a monolithic unit. In fact, the concrete would tend to fall away from the reinforcing steel if the structure were subjected to impact or to a reversal of the stresses. However, in a reinforced slag concrete structure which has been similarly loaded to develop major cracks, practically no minor cracks causing a failure of bond exist. The concrete, aside from the major cracks, is sound, and a reversal of the stresses or subjecting the structure to impact would not result in collapse.

Lightness

Slag and bank sand concrete weighs 124 lb. per cu. ft. Crushed stone and bank sand concrete weighs 150 lb. per cu. ft. This means that the slag concrete is 17¾ per cent lighter than the stone concrete.

If two boxes each 12 in. square and 8½ in. deep by ½ in. thick were made of these respective concretes and placed in water, they would float at different elevations. The box made of slag concrete would weigh 18.4 lb. and would draw 3½ in. of water, and the box made of crushed stone would weigh 22 lb. and draw 4.2 in. of water.

While this comparison would not hold exactly in considering the buoyancy of the hull of a ship made of concrete, the difference of 17¾ per cent in the unit weights of these two concretes would make a noticeable difference in the draft of a vessel and in its ability to resist the shock of heavy seas.

Bond Strength

The bond strength of two 1:2:4 concretes under test indicated that at the end of two months the bond between steel and the crushed stone concrete was 505 lb. per sq. in., and in the case of the slag concrete 610 lb. per sq. in., or 20 per cent greater. This difference held nearly constant for a 16 months' observation period. At the end of six months, for example, the bond stress was 635 and 760 lb. for the stone and slag concretes respectively.

A high bond strength makes a structure less liable to failure. In the case of a concrete hull which is subjected to a maximum variety of stresses, it would increase the factor of safety and very materially lower the liability to serious tension cracks resulting in leaks and in the exposure of the reinforcing steel to corrosion.

Resistance to Impact

The resistance to impact or ability to absorb shocks or blows is an important factor which must be met by the material used in the construction of a hull of a concrete vessel. It was noticed that slag was a tougher or more elastic material than the other concretes under investigation and it was therefore decided to measure this resistance to impact on an impact machine. Fig. 2 shows four 5 x 5-in. blocks of concrete 16 months old tested in the impact machine. This machine delivered a blow equal to a 25-lb. weight falling 15 in. The load was concentrated on a 1-in. diameter striking point. The pebble concrete withstood 6 blows, the crushed stone concrete 7 blows, and the slag and bank sand concrete 10 blows. A slag and slag sand concrete

*Until recently professor of industrial engineering, University of Cincinnati, and now captain Ordnance Department.

specimen is also shown which stands impact exceptionally well but is too porous to be considered in this particular problem. The difference in the bond between the mortar and the large aggregate which was mentioned under compressive strength is very apparent here and seems to offer a reason for the much higher results secured in working with the slag concrete.

These impact tests on blocks are a measure of the resisting ability of a material to withstand blows and absorb vibration. It is not sufficient to know how much dead load a material will stand if it is to be subjected to a variety of stresses. Cast iron is an ideal material to take compression but it ranks very low in bridge construction. Therefore, the concrete which withstands shock as well as high compressive loads is a better material to use in construction of a concrete ship hull than one which does not meet these conditions.

From the results obtained from the impact tests on blocks it was expected that beams made of slag concrete would be superior to crushed stone concrete beams in the matter of resisting shock. Two beams were thus tested by impact. The blows delivered were of increasing intensity. The slag specimen absorbed 12 blows before failure as against 8 blows taken by the crushed stone concrete beam. It should be noted that the slag beam not only withstood 4 more blows but also that these extra blows were all harder than the last blow delivered to the crushed stone concrete beam. Fig. 3 gives a view of the impact machine used in making the block and the beam tests.

In addition to the important characteristics already outlined, slag concrete proved superior to other concretes in transverse beam tests. Three concrete beams with reinforcing, Fig. 4, were made for the purpose of bringing out the relative resistance of concrete to load. These beams were a 1:2:4 mix, being made of crushed stone, pebbles, and slag respectively, as the coarse aggregate, and washed bank sand as the fine aggregate. They were tested in 28 days. The beam made of crushed stone and bank sand failed at 2500 lb. and the first crack appeared at 1750 lb. The beam made of pebbles and bank sand failed at 2200 lb. and the first crack

Fig. 1—Comparative Compression Tests

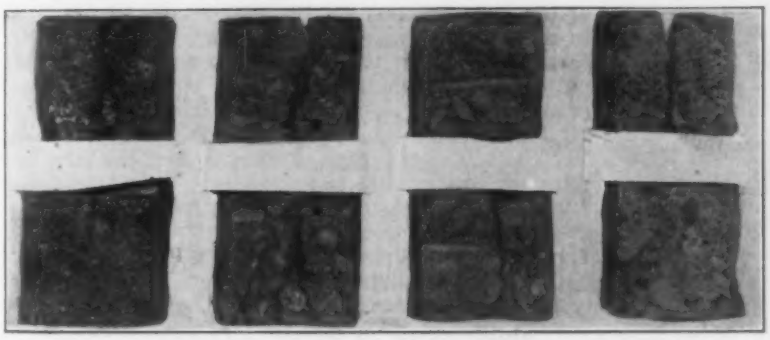


Fig. 2—Comparative Impact Tests

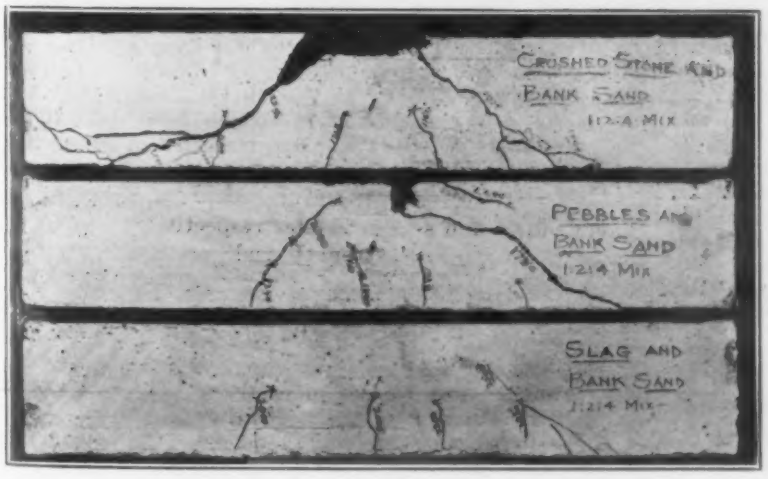


Fig. 4—Comparative Transverse Reinforced Beam Tests

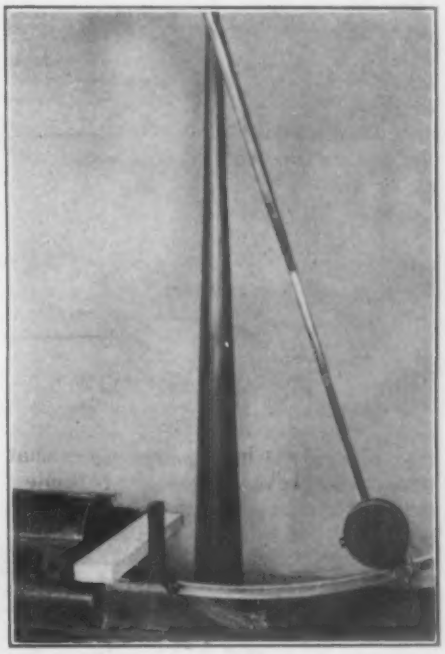


Fig. 3—Impact Machine as Used in Beam Tests

Fig. 1—Comparison of Breaks under Compression of Specimens One Year Old of 1:2:4 Mix. That at the left is of slag and bank sand; compressive strength, 3820 lb. per sq. in. That in the middle is of pebbles and bank sand; compressive strength, 3135 lb. That at the right is of crushed stone and bank sand; compressive strength, 3010 lb.

Fig. 2—Comparative Strength under Impact of Concrete Blocks Subjected to Blows Delivered Equivalent to a Weight of 25 lb. Falling 15 in. From left to right: Slag and slag sand, 18 blows; pebbles and bank sand, 6 blows; crushed stone and bank sand, 7 blows; slag and bank sand, 10 blows.

Superiority of Slag Concrete Over Crushed Stone and Pebble Concretes as Shown by Compression, Impact and Flexure Tests

appeared at 1000 lb. The beam of slag and bank sand stood 2500 lb. with no signs of failure except small tension cracks, and the beam at the conclusion of the test was sound, ringing when tapped with a hammer. The photograph gives an accurate idea of the resistance offered by the three beams to transverse loading.

The behavior of a mortar when subjected to tension is considered a good measure of the value of the sand and cement when used in concrete. Slag sand, bank sand, and standard Ottawa sand mortar were subjected to tension tests over a six months' period. Slag mortar compared favorably with washed bank sand mortar of high quality.

Conclusion

In conclusion, these tests indicate that, in comparison with crushed stone concrete,

(a) Slag concrete has 27 per cent greater compressive strength.
(b) Slag concrete weighs 17¾ per cent less.
(c) Slag concrete has 20 per cent higher bond strength.
(d) Slag concrete has 40 per cent higher resistance to impact.

These results are only a few of the many interesting comparisons which have been made between the available concrete aggregates, and it is fully appreciated that these facts, important as they are, touch only at a few points the problem of concrete ship construction. If the information and data given will be discussed, and other investigators induced to publish their results, a large amount of valuable information may be collected which may aid materially in successfully standardizing the design, construction and material used in concrete ship building.

Industrial Housing Developments

The Bethlehem Steel Co. has commenced the construction of 1500 houses for employees at the South Bethlehem, Pa., works on the Pembroek farm property, near Bethlehem, recently acquired. The entire project is estimated to cost about $1,000,000, and will include the laying out of improved streets, sewers, etc., in connection with the erection of dwelling houses, a number of apartment houses, about 78 x 145 ft., a community house and recreation building, a community garage and other structures. R. S. Rathbun, Allentown, has the contract for the work.

An industrial housing exhibit will be held at Newark, N. J., during the week of July 20-27. Through a combination of local civic and business interests, the exposition will assume broad proportions and cover all features of interest in connection with this subject. A full size, five-room house, completely furnished, and particularly designed as an appropriate war worker's dwelling will be shown. The exposition will be held at the Krueger Auditorium.

The Bureau of Industrial Housing and Transportation, Department of Labor, Washington, is having plans prepared for the construction of 85 two and one-half story, detached and semi-detached houses to be erected at South Charleston, W. Va., for employees at the Government works in that section. Godley, Haskell & Sedgwick, 244 Madison Avenue, New York, are architects.

The Traylor Shipbuilding Corporation, Cornwells, Pa., has commenced the erection of 50 houses for employees at the local shipyards. The houses will contain from four to seven rooms, and average in cost about $1,500. The new housing section now being developed will be located north of the works. The yard is now giving employment to about 3600 men, 3000 on day shift and about 600 at night.

Case Hardening by a New Method

A new suggestion in case hardening of iron or steel is contained in a patent (U. S. 1,260,787—March 26, 1918) granted to John R. Messersmith, Cincinnati. Its use is claimed to retain the desired percentage of carbon and to avoid oxidation in the machined or otherwise finished product. It is also stated that the center or core will remain in its natural soft and tough condition. The process is carried out by the use of a mixture of yellow prussiate of potash, common salt and rosin. A layer of this mixture is placed in contact with the metal in a box containing oak sawdust or a similar packing. The box is heated in a furnace to 1600 to 1700 deg. Fahr. for several hours to suit the depth of hardening desired. The metal is then plunged in cold water at from 1400 to 1500 deg. Fahr., and after it is thoroughly cool it is again heated in the box to 1400 to 1500 deg. Fahr. and again withdrawn and immersed in water for a hard surface or in oil for a tough and softer one.

Electric Pig Iron and Ferroalloys in Canada

Electric pig iron from Canadian ores containing titanium was considered recently by Dr. Alfred Stansfield in a paper, "Recent Advances in Canadian Metallurgy," before the March meeting of the Canadian Society of Civil Engineers. He said that a recent study of the Lake St. John (Quebec) district has caused him to modify his opinion, expressed after a study of the Swedish industry just prior to the war, that it would not be profitable to produce electric pig iron in Canada, since at Lake St. John a high-grade white iron containing titanium appears to be a desirable possibility. The Canadian production of electric steel has increased from 61 tons in 1914 to approximately 50,000 tons in 1917, mostly as shell billets from steel scrap. Several furnaces are in operation in and about Montreal, the Munitions Board has built ten 6-ton furnaces at Toronto, described in THE IRON AGE, April 25, 1918, and the Armstrong Whitworth Co. has built a plant for the production of electric tool steel at Longueuil. While the furnace at Belleville has made much good steel from titaniferous ore, it has been found cheaper to use scrap. This furnace and another at Orilla have recently been fully occupied with the production of ferromolybdenum. Before the war from 8000 to 10,000 tons of ferroalloys, mostly ferrosilicon, were made annually at Welland by the Electro-Metals, Ltd. This alloy is now made also at Shawinigan. In 1916 the production of ferroalloys had increased to 28,600 tons, valued at $1,777,000, and included a large tonnage of ferrophosphorus made at Buckingham, Que., by the Electric Reduction Co.

First American Greaves-Etchells Furnace Now Operating

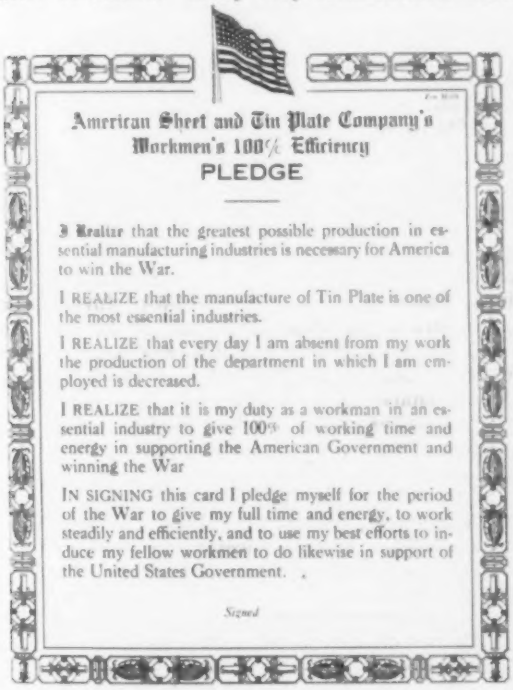
The Electric Furnace Construction Co., Philadelphia, completed and placed in operation recently a ½-ton electric furnace of the Greaves-Etchells type at the plant of the Ford Motor Co., at Detroit. It is operating on nickel-chrome steel for special airplane work, producing heats in as low as 1½ hours. This is the first electric furnace of this type to be placed in operation in the United States, although a considerable number are in operation in England. In July the following additional furnaces will be placed in operation: Two 3-ton furnaces at the plant of the Halcomb Steel Co., Syracuse, N. Y.; one 6-ton furnace at the navy yard, Puget Sound, Wash., and two 6-ton furnaces at the plant of the American Radiator Co., Buffalo.

Arrangements are being made for the launching of the first vessel at the Hog Island shipyards on Aug. 4. This ship, to be known as the Red Jacket, is an 8000-ton freighter, and is now more than 50 per cent completed. The outer plates of the hull and the bow and stern plates are in place.

Stimulating Work and Buying of Bonds

Plan of the American Steel & Tin Plate Co. Increases Production—Buffalo Bolt Co. Has Novel Method of Encouraging Saving

LONG before the United States entered the world war it devolved on this country not only to raise enough foodstuffs to feed its own people but also a very large part of the quantity needed to feed the Allied countries. In order that these foods could be packed and exported to our Allies it further devolved upon the sheet and tin-plate manufacturers to turn out every ton of sheets and tin plate that could be produced. The Government repeatedly has requested manufacturers of tin plate and sheets, particularly the former, to let nothing stand in the way of 100 per cent production, in order that enough cans could be made to pack all foodstuffs and have the materials in time to take care of the immense fruit and vegetable crops. The support given the Government by the sheet and tin-plate manufacturers in their efforts to produce the maximum output of sheets and tin plate is already a matter of record. Many very commendable schemes



American Sheet and Tin Plate Company's Workmen's 100% Efficiency

PLEDGE

I Realize that the greatest possible production in essential manufacturing industries is necessary for America to win the War.

I REALIZE that the manufacture of Tin Plate is one of the most essential industries.

I REALIZE that every day I am absent from my work the production of the department in which I am employed is decreased.

I REALIZE that it is my duty as a workman in an essential industry to give 100% of working time and energy in supporting the American Government and winning the War

IN SIGNING this card I pledge myself for the period of the War to give my full time and energy, to work steadily and efficiently, and to use my best efforts to induce my fellow workmen to do likewise in support of the United States Government.

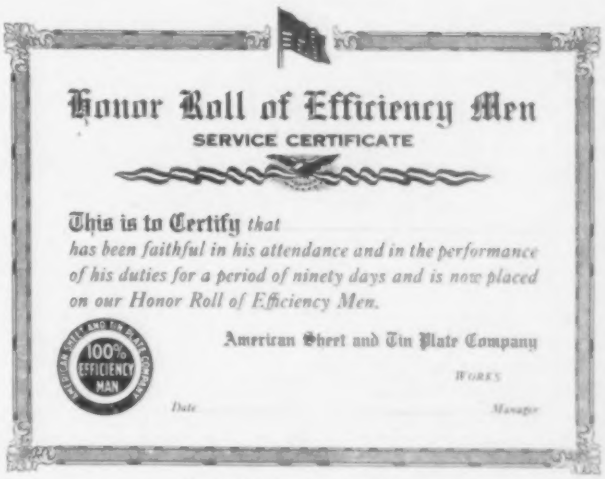
Signed

Efficiency Pledge

have been adopted to insure maximum production and with good success. The earnings of sheet and tin-mill employees for the past two years have had a tendency to make them somewhat indifferent about working full time. At many plants they have worked only three or four days a week and loafed the rest of the week. This was a natural result of the immense earnings, which in the case of some rollers and heaters in hot sheet and tin mills have ranged from $950 to $1,100 per month.

The Plan as Worked Out

The executive and operating officials of the American Sheet & Tin Plate Co., at Pittsburgh, in their efforts to induce their men to work full time and get out maximum production of sheets and tin plate, have recently worked out and put in operation a very successful plan, and one that is unique. This plan, which was described briefly in an editorial in THE IRON AGE, July 11, was taken up early in May, and was first tried out at its Monessen, Pa., tin-plate plant, which has 25 hot tin mills, employing about 1850 men, and also at its Farrell, Pa., works, which has 30 tin mills, and employs 2500 men. Later there were posted at



Honor Roll of Efficiency Men

SERVICE CERTIFICATE

This is to Certify *that*

has been faithful in his attendance and in the performance of his duties for a period of ninety days and is now placed on our Honor Roll of Efficiency Men.

American Sheet and Tin Plate Company

100% EFFICIENCY MAN

WORKS

Date *Manager*

Roll of Honor Certificate

all plants of the company notices printed in the English, Polish, Slovac, Hungarian, Italian and Greek languages, and what is known as a workmen's 100 per cent efficiency pledge, reproduced on this page. The pledge was printed on glazed cardboard about 7 x 9 in., with the American flag in the center at the top, and every workman in all the sheet and tin-plate mills of the American Sheet & Tin Plate Co. was furnished one of the cards and asked to sign it and return it to his foreman. As soon as the cards were signed and returned each workman received a white 100 per cent efficiency button, which he was requested to wear at all times. On completion of 30 days' continuous service this white button is exchanged for a red button; on completion of 60 days' continuous service the red button is to be exchanged for a blue button; and on completion of 90 days' continuous service the blue button will be exchanged for a red, white and blue button. The red, white and blue button is to be retained as long as the holder works steadily and efficiently. Along with this red, white and blue button a service certificate will be presented to each workman. This certificate is also printed on heavy white cardboard, in red and blue ink, patriotic colors, with a white background, and has

EMPLOYEE'S LOYALTY PLEDGE CARD

FOR MORE MATERIAL FOR THE WAR

Buffalo Bolt Company

To .....

For the purpose of providing our Allies and the United States Government with more war material, and as nearly all of the output of this Company is for such purposes, and, wishing to do my part,

I .....

promise to work overtime on Monday and Friday nights, three hours each night, from 5 to 8 p. m., and I authorize you to hold for my account the money that I earn in this overtime, to be credited to me at the rate of time and a half for day work, piece price and half for piece work for these six hours. This money so earned to be applied to the purchase for me of Liberty bonds of the fourth issue, which undoubtedly will be floated about the middle of October, and I further agree that, should I leave the employ of this company, or be discharged for cause, I will accept as payment for this overtime, thrift stamps equal to the amount to my credit on the books of the Buffalo Bolt Co. when I so quit or am discharged. This agreement is to start on Monday, July 8, and to continue through and until Oct. 11.

Name .....

Address .....

Dept. No...... *Check No.*.....

the American flag on the center of the border at the top.

The Company's Plants

The American Sheet & Tin Plate Co. operates 13 sheet mill plants having a total of 159 hot sheet mills, and also operates 14 tin-plate plants with a total of 240 hot tin mills. The company is employing at present close to 27,000 men, and is turning out by far the largest output of tin plate in its history. Its production of sheets is not so heavy, largely from the fact that there is a shortage in the supply of sheet bars, and also because the company has made special efforts to produce a maximum output of tin plate, which is needed so urgently for the packing of foods.

Another plan for encouraging employees to work regularly includes a novel provision for saving to purchase Liberty bonds of the fourth issue. This plan has been adopted by the Buffalo Bolt Co., Buffalo, and the card reproduced on page 155 has been signed by all of its employees, numbering 850:

The plan was worked out by the general superintendent, W. B. Peirce, and the company expresses the hope that it may be adopted throughout the country.

LABOR STEALING

War Industries Board Will Punish Offenders—Employment of Children

WASHINGTON, July 15.—Drastic treatment of manufacturers guilty of labor stealing has been determined upon by the War Industries Board. As a short and effective method of reaching this evil, and of compelling the discontinuance of the practice, the board will withhold from offending employers the privilege of obtaining priority certificates, and will revoke orders including them in the preference list of the Priorities Board. This summary method has been decided upon as the result of a review of a large number of complaints recently received from manufacturers having Government contracts, and the plan of the board to meet the abuse is set forth in part in the following resolution formally adopted on July 11:

Be it resolved by the War Industries Board:

First: That the practice of manufacturers using competitive peace-time methods in the procurement of labor, resulting in the withdrawal of labor from war industries, is strongly disapproved, and henceforth this Board, through its priorities division, will in proper cases withhold priority assistance from employers who persist in pursuing such methods.

Second: That a copy of this resolution be certified to the chairman of the War Labor Policies Board and to all other Governmental agencies employing or dealing with labor and that it be given general publicity.

Employment of Children

The decision of the United States Supreme Court holding the Federal child labor law to be unconstitutional has brought to Washington hundreds of inquiries from manufacturers engaged upon Government contracts who desire to know the position that will be taken by the Government with respect to child labor. Queries have also been coming in of late with regard to the right of manufacturers to employ convict labor, a right which certain authorities hold is materially restricted by both Federal and State statutes. The War Labor Policies Board has given careful consideration to these questions, and has reached the conclusion that the Government, acting under war powers delegated to the President by Congress, can make its own rules with regard to the employment of both child and convict labor so long as such rules do not contravene any State statute. The board has therefore promulgated the following statement of the position of all the production departments of the Government:

All work required in carrying out this contract shall be performed in full compliance with the laws of the State, Territory or District of Columbia where such labor is performed. A contractor shall not directly or indirectly employ in the performance of this contract any minor under the age of 14 years, or permit any minor between the age of 14 and 16 years to work more than eight hours in any one day, more than six days in any one week, or before 6 a.m. or after 7 p.m. Nor shall the contractor directly or indirectly employ any person undergoing sentence or imprisonment at hard labor which may have been imposed by a court of any State, territory or municipality having criminal jurisdiction.

It is probable that early steps will be taken to deal with these matters more comprehensively through the contracting system, which is now being rapidly standardized. The law officers of the Department of Labor are of the opinion that the Government has the right, even in default of any statutes on the subject, to incorporate in war contracts any reasonable requirement respecting child and prison labor, and that manufacturers accepting such contracts are bound thereby and are liable to the cancellation of their contracts if not to other penalties, as the result of violating the restrictive provisions. Good lawyers here decline to accept the proposition that contractors would incur any liability beyond the cancellation of their contracts should they employ child labor, unless such employment is forbidden by the States in which the manufacturing establishments are located. For all practical purposes, however, the power of the Government to cancel contracts would probably be sufficient to insure a reasonable degree of compliance with its wishes.

Many Protests Received

The recently promulgated announcement that after Aug. 1 unskilled labor must be recruited exclusively through the United States Employment Service has brought a flood of protests to Washington from those not engaged on war contracts. Many manufacturers employing from 10 to 50 men have declared that the conditions surrounding their establishments are such that the proposed requirement would put them out of business. In many cases, manufacturers having small war contracts, but whose products are chiefly taken by the commercial trade, express their desire to surrender their Government business rather than subject their entire establishments to the restrictions imposed by the new order of the employment service.

After careful consideration of these protests the Department of Labor has decided that only manufacturers engaged on war contracts and employing over 100 workers will be required to obtain their unskilled labor through the United States Employment Service. In addition, certain other exceptions have been decided upon which will materially relieve the situation. Private recruiting of labor may still be carried on subject to the principle and specifications set forth in the following statement:

Non-war industries are affected only indirectly. But they are one and all affected indirectly from the fact that the war industries of the Nation are now of paramount importance, demanding sacrifice and co-operation from all employers not engaged in war work in order that they may function with maximum efficiency.

Non-war industries, therefore, must not offer superior inducements, prevent the transfer of workers urgently needed for war production, or in any way attempt to compete with the Government for labor. The following five classes of labor need not at the present time be recruited through the United States Employment Service, although, of course, the machinery of the Employment Service is available to all employers needing these classes:—

1. Labor which is not directly or indirectly solicited.
2. Labor for railroads, except in so far as the Director General of Railroads has already or may in the future require that recruiting shall be exclusively through the United States Employment Service.
3. Farm labor—to be recruited in accordance with existing arrangement with the Department of Agriculture.
4. Labor for non-war work.
5. Labor for establishments the maximum force of which (including the additional number recruited) does not exceed one hundred employees.

It is understood that additional exemptions will be granted in cases where it can be shown that manufacturers have endeavored to comply with the regulation respecting the recruiting of unskilled labor and have not been able to secure a sufficient force of workers because of the inability of the employment service to provide them.

British Engineering Trades After War

Allied Duties Against Enemy Products —Essential Imports Include Tungsten and Magnetos — Colonial Preferences

The following summarizes the recommendations contained in the report of the committee appointed by the British Board of Trade to consider the position of the engineering trades after the war. The report is a voluminous document and is unanimous. Evidence was taken from 31 different branches of the engineering industries, and witnesses were examined upon such matters as American trade methods, standardization, German cartels, combinations, works organization, costs, etc. The special items of material brought particularly to the notice of the committee as those which the engineering trades have hitherto imported were the following:

Tungsten.—Because the production of the metal from the ore, before the war, was almost entirely in German hands.

Spiegeleisen.—Trade hitherto largely in German hands.

Ferrovanadium.—At present solely manufactured in the United States from raw material obtained from mines in Peru, owned by an American company which has a practical monopoly.

Swedish Iron and Steel.—Raw material for the crucible steel trade in the form of bars, pig iron and scrap.

Porcelain Fittings.—From Germany for ignitions for internal combustion engines, also for scientific instruments.

Optical Glass.—Almost entirely produced in Germany, Austria and France, the production from Italy being vary small.

Chemical Glass.—Never produced in Great Britain and is entirely of German and Austrian make.

Soft Wood and Other Timbers.—From various foreign sources.

Boiler Tubes.—From Germany.

Various Castings, Forgings and Stampings. — From Germany, Belgium and France; and particularly Belgian iron castings, which are used for special purposes.

Carbon Steel Drills, Cutters and Reamers.—These have been largely imported from the United States and Germany.

Gages and Measuring Instruments.—These also have been largely imported from the United States and Germany.

Magnetos.—Practically a monopoly of the Bosch company, both in Germany and the United States.

Ferrotungsten

As regards tungsten (tungsten powder and ferrotungsten) the report states:

1. It is essential that tungsten should be manufactured within the empire in such quantities that the normal demands should be easily met, and a sufficient supply for export manufactured, so that in case of an abnormal demand for defensive or other purposes, an adequate supply shall be available within the empire.

2. That the works manufacturing tungsten which have come into existence, either at the request of the government or otherwise during the war, shall receive subsidies or special consideration as regards excess profits tax in relation to the amount of money they have sunk in the industry, either by way of wolfram ore dressing plant, tungsten producing works, research work, mines or concessions for the raising of wolfram ore, and generally with a view to meeting German competition after the war.

Protection Against Enemy Products

The general conclusions reached by the committee may be summarized as follows:

Enemy Goods.—(a) To give time for the reorganization of the engineering works after the war, the importation of enemy engineering products into the United Kingdom be prohibited, except under license, for a minimum period of one year and for such longer period as may be deemed expedient.

(b) To encourage trade between present Allies, that they be invited, without interference with their existing fiscal systems, to consider the imposition of an additional duty or surtax over and above their normal duties, to be levied solely against the products of the present enemy countries, such surtax to be subject to progressive diminution.

(c) That this country impose a duty equal to such surtax on the products of present enemy countries and to be subject to like progressive diminution.

Guarding Home Industries

Materials.—That raw materials be admitted duty free.

Essential Industries.—(a) That a government department be charged with the duty of exercising vigilance over the adequate provision in this country of manufactures as distinct from our staple trades, which are at any time essential to the national safety, such as tungsten and magnetos.

(b) That the development of the supply of raw materials within the empire for such essential industries be supervised, encouraged and assisted by the government.

(c) That all necessary steps to protect such essential industries be taken by the government, whether by prohibition, tariff protection or subsidy.

Dumping.—That "dumping" as defined by American law be prohibited.

Purchase by Government, Municipalities, etc.—That it should be the recognized duty of government departments, municipalities and corporations to purchase, as far as possible, goods only of British origin, due precaution being taken to prevent price rings.

Larger Units.—That engineering manufacturers be encouraged to work together in larger units, either by amalgamation or by joint working, by pooling of resources, by specializing production, and by organization of export sales, and for the purchase of raw materials.

Trade Combinations.—That the terms of all trade combinations, whether of employers or employed, be registered at a government department.

Standardization. — That standardization of products should be more widely practiced.

Finance, Preferences and Freights

Finance.—(a) That the proposed British Trade Corporation be supported.

(b) That foreign financial intelligence and the standing of foreign firms and companies be made a feature of trade information by the British Trading Corporation.

(c) That the proposed Trade Bank referred to in the report of Lord Faringdon's committee should establish and conduct a system of insurance which would enable British traders to insure against the risks of current foreign bills of exchange relating to overseas trade with customers approved by that bank.

(d) That before a quotation on the London Stock Exchange is granted to any foreign issue, regard shall be had by the committee of the Stock Exchange as to whether due provision is made for spending a suitable proportion of all money raised in this country in the purchase from British manufacturers of any goods required.

Preference Within the Empire—That India and the Dominions shall be invited to concede an effective preference to the goods of the British Empire.

Freight Combines and Rates.—(a) That the terms of any conference to which British shipowners are parties be registered at the Board of Trade.

(b) That for a period of three years after the war no conference arrangement be permitted between British ship owners and present enemies. That British traders have rates for shipping goods at any United Kingdom port not higher than those at any North Sea or Channel port.

(c) That special facilities be given by railroad and shipping companies on trade for export.

Marking of Foreign Goods.—That all goods of foreign origin should have clearly and indelibly marked upon each article the words "Not British."

Important Decisions in Labor Cases

National Board Announces It Will Dispose of Living Wage and Basic Day Questions at an Early Date—Members Not United in Opinion

WASHINGTON, July 16.—The National War Labor Board, in promulgating decisions in two important controversies, announces that on July 23 it will consider and decide the questions of a minimum living wage and a basic 8-hr. day. In the decisions heretofore handed down, the board has considered wages and hours of labor in the particular plants under investigation, but has avoided the adoption of a general rule for the Government either of concerns having war contracts or those doing commercial work, or both. The determinations to be reached July 23, however, will be fundamental in character and will thereafter apply at least to all establishments having Government contracts, and will therefore indirectly affect all manufacturers.

In the first of the two important cases settled here during the past week, the board readjusted wage scales in eight plants employing 3000 men at Waynesboro, Pa. These plants include the Frick Co., Emerson-Brantingham Co., Landis Tool Co., Landis Machine Co., Bostick-Lyons Bronze Co., Shearer Machine Co., Victor Tool Co., and Cashman Tool Co. In fixing 40 cents per hour as the minimum rate to be paid any class of workers, including common laborers, in these plants, the board announced that it has taken under consideration the question of determining the living wage which, under its principles, must be the minimum rate "to permit the worker and his family to subsist in health and reasonable comfort." This question was made a special order of business for Tuesday, July 23, and the award in the Waynesboro cases will be subject to readjustment on any basis that may finally be adopted.

Large Wage Increases

In the Waynesboro case, the award of the board gives many of the workers wage increases greatly in excess of their demands, to gain which they were recently on strike. For instance, the minimum rate is fixed at 40 cents per hour, while the minimum rate demanded was 30 cents per hour. Until now common laborers at Waynesboro have been receiving as little as 22 cents per hour. The increase to the lowest paid men, therefore, will be 81 per cent. Skilled workers were awarded the increases they demanded. Toolmakers, die-makers, jig-makers, gage-makers and bench-tool machinists were given 60 cents per hour, journeymen machinists with four years' experience 55 cents, acetylene welders 45 to 50 cents, patternmakers and iron molders 65 cents, blacksmiths and boiler-makers 60 cents, carpenters 50 cents, painters, plumbers and sheet-metal workers 60 cents, cupola tenders 40 cents, engineers 50 cents, firemen 45 cents, hammer men 40 cents. Following is the text of the board's decision in the Waynesboro case:

(1) The number of working hours in this plant shall be the same as at present.

(2) That time and one half for ordinary overtime and double time for Sundays and those holidays fixed by the statutes of Pennsylvania be granted.

(3) That the employers shall meet with committees of their own men in the various shops.

(4) That pay days shall be once per week on companies' time and no more than three days' pay shall be retained.

(5) That there shall be no discrimination against union men, and that the unions shall not be permitted to use coercive means to obtains their object in any event.

(6) The minimum rate to be the rates of pay fixed in the report of Mr. Hewitt (see appendix "A") except that the payment of any man in any classification shall not be below 40 cents per hour.

(7) That apprentices be given an opportunity to learn a trade under circumstances as to character of work and compensation as may be agreed upon between committees of the men and their employers.

(8) That the request of the employees to the effect that all piece work and premium work be abolished be denied.

(9) That in case of depression, hours be reduced before men are laid off.

(10) That for the purpose of carying out the award of the board, the board retain jurisdiction over the Waynesboro case, acting through the section of the board already appointed on the case, or through an examiner directed by the secretary to see that the award is put in force and becomes effective.

(11) That the award of this board shall be retroactive to the date on which it was agreed by both sides to submit the case to the arbitration of this board.

Worthington Pump Decision

The second decision was made in the controversy between the Worthington Pump & Machinery Co. and its employees in the Blake-Knowles plant at East Cambridge, Mass., and in the Snow Plant at Buffalo. The East Cambridge plant had been tied up for several days by a strike of 1000 workmen. At both places, the paramount issue was the application of the basic 8-hr. day. A wage dispute formed a part of the controversy at East Cambridge. The section of the board assigned to the case, composed of Loyall A. Osborne and Fred. Hewitt, representing respectively capital and labor, readily came to agreement on the question of wages, but disagreed on the question of the application of the basic 8-hr. day, Mr. Hewitt holding that the basic 8-hr. day should be applied, Mr. Osborne taking the opposite position.

The controversy was referred by the section back to the entire board, which approved the section's award as to wages at the plant at East Cambridge, and decided, upon a resolution offered by Frank P. Walsh, one of the two joint-chairmen, that the basic 8-hr. day be installed at once at both plants, at the same time announcing that the board is considering the matter of the determination of what should be fixed as the proper working day. As in the matter of the living wage, final consideration of the question of the basic work-day was fixed as a special order of business for Tuesday, July 23. The decision to apply the 8-hr. day at Buffalo and East Cambridge was predicated upon a statement of the Secretary of the Navy that a Governmental necessity existed in the plants and that the Navy Department favored the installation of the basic 8-hr. day in all plants engaged on Navy work.

Retains Jurisdiction

For the purpose of carrying out the award, the board retained jurisdiction over the Worthington Pump & Machinery Co. case and an administrator will be detailed to see that the award is enforced and made effective immediately.

The contention of the company in this case was that it was operating upon a fixed price sub-contract made on the basis of a 10-hr. work day. The 8-hr. law has been interpreted by some Governmental departments

as not applying to sub-contract shops. Under the award, if the company continues to employ its workers 10 hours a day, it will be necessary for it to pay them at the rate of straight time for eight hours and time and one-half for the two additional hours, or, in other words, 11 hours' pay for 10 hours' work.

The decision of the board in the case of the Worthington Pump & Machinery Co. is in part as follows:

The board decides that the following rates shall apply in the Blake-Knowles plant:—

Toolmakers—72 cents per hour.
Machinists, first class—72 cents per hour.
Machinists, second class—62 cents per hour.
Specialists and handymen—52 cents.
Helpers—46 cents.

Regarding the classification of machinists, the board decides that it will be unwise for it to fix an arbitrary figure as to the number of machinists to be specified in the first-class. The board, therefore, recomends that individual cases —where disputes arise concerning classification of the employee—be decided by the contending parties on the merits of each particular case. The board feels sure that no difficulty will be experienced by the contending parties in handling this question.

The decision of the board in this case with regard to the length of the working day is subject to modification in the event that any change should be made as the result of the consideration to be given July 23 to the proposal looking to the general adoption of the 8-hr. day.

Regulation of Labor in the Connellsville Coke Region

UNIONTOWN, PA., July 16—Absence without cause more than one day per week of workmen from the "coke trenches" must be reported by the operators to the Fayette County Fuel Administration in a plan put into effect in the Connellsville region this week as a means of further increasing the man-power efficiency of the region. The plan was put into effect here following the return from Washington of C. E. Lenhart and R. M. Fry, of Uniontown, and J. M. Jamison of Greensburg, members of the regional committee of the Fuel Administration's coke division.

Such a supervision of labor, Fuel Administration officials point out, will have a substantial moral effect upon the workmen, the object of the plan being to impress upon the miners the fact that any irregularity at work will come to the immediate attention of the Government through the Fuel Administration. Where moral suasion does not produce the required results, such men as are within the draft ages will be reached through the draft authorities under the "work or fight" order.

The great majority of workers are loyal and are putting their best efforts into their daily labor, but a slight minority have permitted the high wages they are receiving to interfere with their regularity.

Australian Zinc Concentrates for the British

The Australian Government has contracted to sell to the British Government the whole output of zinc concentrates in Australia for the period of the war and 10 years thereafter, according to Howard A. Treat, secretary to the United States commercial attaché, Melbourne, Australia. On his previous visit to London the prime minister contracted for the sale to the Imperial Government of 100,000 tons of zinc concentrates and 45,000 tons of electrolytic zinc and spelter for 10 years. The new arrangement contemplates the British Government taking the stocks of zinc concentrates on hand Dec. 31, 1917, less a definite percentage reserve, and thereafter 250,000 tons per year for the period of the war, and 300,000 tons annually for the following nine years. Provision is also made for supplying the requirements of the Australian zinc refining works and the fulfilling of Japanese contracts during the period covered by the British contract. It is also hoped to extend the contract to take in copper and lead. Under normal conditions the Australian output of zinc concentrates, averaging from 46 to 48 per cent zinc, is about 400,000 tons per year.

STEEL SAVING CAMPAIGN

New Regulations Adopted After Conferring with Manufacturers

WASHINGTON, July 16.—The steel saving campaign of the War Industries Board is being prosecuted with great vigor under the general supervision of the conservation division and with the advice of Director of Steel Supply Replogle. Manufacturers in all lines are co-operating heartily and very substantial economies are being worked out that will undoubtedly result in the release of a large aggregate tonnage of steel.

The conservation division has completed a comprehensive investigation of the general farm implement and farm operating equipment industry and, after numerous preparatory meetings, a detailed schedule of types and sizes of the principal class of farm implements and farm operating equipment to be manufactured during the war period has been formally adopted by all the interests involved.

Under the elimination program, approximately 3000 surplus types of plows and tillage implements have been discontinued. For example, out of 303 types of plows only 65 will be manufactured after Dec. 31, 1918. Of over 300 types of corn planters and drills, only 10 will be manufactured, and 107 types of harrows have been reduced to 44.

In addition to the reduction in styles and, consequently, of stocks carried, concentrating efforts on fewer types is expected to work toward stabilizing the cost to the farmer without hardship on the producer. Further elimination of unnecessary types and additional standardization is being worked out by various committees representing different branches of the industry in connection with the War Industries Board.

Following the conferences with the manufacturers of steel and brass beds recently held here the conservation division, during the past week, decided to summon to Washington manufacturers of all kinds of beds, including davenports, to discuss economies that might be carried out during the war period. The first conference developed the fact that the quantity of steel and brass used by the various branches of this industry is much larger than had been supposed, thus emphasizing the importance of standardizing the output of the industry in order to conserve steel, brass and other materials and labor.

The meetings just held here developed the interesting fact that a single line produced by a metal bed manufacturer included no less than one hundred designs, the great variety resulting from competition in the industry which has been progressive during the last five or six years. A tentative agreement was easily reached with the producers to cut down all lines of steel bedsteads and cribs to 30 designs and to reduce the number of brass bedstead designs to 15. The conservation division also recommended that manufacturers discontinue the use of round tubes larger than 2 in. in diameter; square tubes larger than 2½ in., and substitute light wall tubing for heavier gages wherever practicable.

Savings can be brought about, the experts of the conservation division believe, by discontinuing the use of steel springs for the backs of davenports and by substituting band iron supports or wooden slats for all other springs.

The conference developed the fact that an endless number of styles of steel bed springs are now on the market, including many varieties of the familiar woven, spiral and link fabric springs. Jobbers and retailers carry enormous stocks of these springs to meet a demand that has been stimulated by the competition of producers to satisfy every fancy. After some discussion the manufacturers agreed to make a serious effort to cut down to six the number of styles of steel bed springs to be manufactured hereafter. It will still be necessary, they claim, to make up these various styles in six or eight sizes. The manufacturers all agreed to assist in conserving shipping space by the most careful methods of packing and by making up goods in such a way as to facilitate their shipment knocked down.

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THE IRON AGE

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Steel Control by Producers

The regulations of the War Industries Board for the delivery of pig iron and steel products, lately revised as reported in THE IRON AGE of July 4 and July 11, represent in substance a scheme for flexible control of deliveries by producers. If the operation works out in the way that now seems probable, the shipment of material will be hedged about by rigid restrictions, but there will be room between the lines for free action, and the restrictions should not prove onerous, in view of the room that is left.

The regulations as formally and officially stated do not lend themselves to a proper perspective of the system itself or a conception of how it is likely to function during the next few months. To obtain the proper perspective the matter must be viewed from a tonnage standpoint. When that is done, class C occupies the foreground, and that is the class of material not involving priorities on the one hand or permits on the other. Shipments of material in class C are to be made by the producers using their own judgment, guided by the "schedule of purposes entitled to preference treatment," beginning with ships and running in sequence through aircraft, munitions and numerous other items and ending with public utilities. The preferences are to be observed in the order in which they are stated. It is not new, but the common practice, for the pig iron and steel producers to regulate their shipments to customers in accordance with their requirements and also, when material is scarce, in accordance with the principle of the greatest good to the greatest number. The principle is now changed, but it is very clearly defined and the producers, accustomed to work according to an intelligent principle rather than a blind following of what the order book says, should experience no difficulty.

If class C does not at present involve the great bulk of the material being produced, it soon will. The priorities, which must be provided for first, are to be reduced and there is promise that they can be greatly reduced. Class D, on the other hand, can never become very important in point of tonnage, for the very simple and sufficient reason that there is no large consumptive demand in the United States that would fall into the category. The great bulk of the demand, expressed or latent, is direct or indirect war material or material included in the preference schedule, with little doubt 80 per cent of the total, perhaps more.

As it is a case of regulating the flow of material, an illustration may be sought from a river which has been dammed. The water that flows freely over the dam is class C. The water that is let through quickly and certainly for emergencies, passes through three sluices of different heights, the priorities AA, A and B. Some water is impounded and allowed to be carried away through the medium of special permits, class D, when it is clear that carrying this water entirely away will not produce an insufficient supply of water below the dam. It all works well enough, water will flow over the dam and the sluices will no longer be necessary, while as much water as is wanted cross-country—not a great deal since the population is thin there—can be spared.

Since the beginning of the war there has been a great deal of discussion, some of it enlightened, some distinctly the reverse, as to what should be done with the iron and steel industry, as to prices and control of supplies. When the subject of price regulation was far up in the air, and prices were likewise far from terra firma, leading producers asserted that the industry could regulate itself if only it were given a prescribed basis, a general scale, according to which it could build its price structure. That basis was furnished by the agreement of Sept. 21, 1917, and the industry has justified its assurance that the thing could be done.

When the matter of regulating deliveries came up, the industry again asserted its ability to manage things. What it desired was a general outline of the order of importance the authorities judged should be observed. That order was prescribed in the preference schedule, but before that schedule was officially announced the industry in large measure had adopted practices that conformed closely with it.

What remains now is for the priorities to be curtailed so that more are filled than granted, dependence being placed upon the preference schedule instead, for effecting the most desirable distribution. Eventually the restrictions and regulations should be scarcely felt and an orderly

and efficient flow of material should ensue. The priority system, while there was a little danger at one time of its eventually breaking down of its own weight, should not be harshly criticized, for it was a necessary resort in the early stages of the war preparation. The wisdom was in providing for its gradual dismissal as the emergency passed and the steady grind was entered upon.

Co-operation in Research

Unless industrial research is at once developed in the United States to a high degree, the future of the nation economically and industrially may be seriously affected. A nation to live must know. Only too slowly is the country appreciating this fact. A nation-wide movement is being fostered to bring about co-operation in research work. Its scope and importance are indicated on other pages. Leaders in science and industry are interested in it and its organization is gradually taking shape. But co-operation must be the keynote. While no inconsiderable amount of such work has been done in the United States, it has been carried out by various industries or on individual initiative. Effort has not been co-ordinated and there has been duplication of results. Conservation of brains and of effort is more essential than ever to-day. The movement already started is one not only to be supported to the limit, but to be hastened as much as possible. The danger is that it may be overshadowed by other war problems.

Both Great Britain and Germany are already far ahead of this country in the perfection of national or governmental co-operation in research. Great Britain has already put in operation a national plan whereby greater efficiency is being secured in industry and greater economy in the use of resources in men and materials. Germany, even before the war, had taken steps in this direction, but now more than ever recognizes its importance in war and peace. Striking advances have been made, one of the most important being the establishment of a German institution for research in iron and steel. It is known as the Kaiser Wilhelm Institute for Research in Iron. Both Great Britain and Germany have already realized that not only safety in war but protection against war depend to a large degree on complete independence in resources. Scientific or industrial research is one of the guarantees of this safety.

A significant development is the co-operation between Great Britain and the United States. Leading scientists and metallurgists in this country are constantly receiving confidential British reports of vital research work done in that country. That this co-operation may be reciprocated and may continue after the war is warmly advocated in many quarters.

Already in this country one result of the meetings of various technical societies has been less secrecy regarding the findings of investigation. A broader feeling of co-operation and co-partnership exists among leaders in industry. The nationalization of research work will increase this commendable tendency, with results redounding to the benefit of all. If after the war the same tendency should develop in the relations of nations now making common cause, all might prove to be gainers.

Chamber of Commerce on Taxation

Any recommendation of the Chamber of Commerce of the United States is entitled to careful and respectful attention by Congress and by the general public. While the conclusions of its committee on taxation await results from the referendum vote, it seems fairly safe to assume that the vote will be strongly affirmative, for when recommendations like those submitted are once put in concrete form it is not easy to oppose them by offering substitute suggestions.

There are two principal planks in the general platform, first, an aggressive "win the war policy"; second, the proposition that the heavier taxes are made now the lighter they can be after the war, when commerce establishes itself and we shall want to be at no disadvantage with other countries. Accordingly, the $8,000,000,000 from taxation against total expenditures of $24,000,000,000, already suggested, is not adopted as an upper limit that should merely be aimed at, but the stand is taken that the program should contemplate raising this sum or more. It is to be a minimum rather than a maximum. Then the idea is developed that the major portion of the sum should be obtained from taxes upon incomes and profits. Taxes on luxuries should be few, but heavy.

The platform stands for liberal exemptions on the one hand and very high rates on really excess profits on the other hand. Obviously that is sound business, and to safeguard the taxation program two methods of computing taxes are proposed—war taxes and excess profit taxes, the tax to be paid to be the one that is the higher, not the one that is the lower.

Amortization, particularly of plants created for war work, has been a very difficult subject. Some manufacturers involved have not recognized the dangers they ran of their assumed profits being wiped out eventually. On the subject of amortization there is a proposal that is at least brilliant, even though it might not be found easy of application and that is to give the taxpayer the choice, either of paying taxes based on a low rate of amortization, with the right reserved to demand some of the money back in case the depreciation proves greater than computed, or of using the higher rate of amortization he proposes and surrendering the property to the Government whenever its cost has been entirely charged off. That proposal will at least bring the subject under the spot light, where it belongs, for it is easily the most difficult feature in all matters of taxation at this time, when the value of the dollar is very much less than before the war and when manufacturing facilities are being so greatly altered for the production of war material.

The plain and practical fact should be distinctly recognized that in the taxation scheme of 1917 there was much trusting to luck. If a manu-

facturer were not accorded an exemption for amortization and other expenses certain to cover the case fully, it was assumed that in most cases the excess profits he was permitted to retain, after the various tax percentages were deducted, would still leave him "to the good" to a greater or less extent, depending on his luck. With a correct system, there should be absolutely full allowance for all just deductions and a very heavy tax upon what are really war profits. It is not feasible, of course, to attempt to take every cent of excess profits, and what may be left should be given some thought from the viewpoint that while the increased cost of living, in essence the depreciation in the dollar, is recognized as good reason why the wage earner's income should be increased, the shareholder, depending on dividends, has been expected to take his chances. His chances will be reduced but he will still be expected to take them cheerfully.

Prohibition Declared Necessary

The patriotic co-operatiton of business men through their organizations in helping to win the war has become one of the most important factors in the great conflict, but no move on the part of organized business has been more impressive than that of the National Coal Association in declaring that in the opinion of the members representing bituminous coal operations with an annual production of nearly 400,000,000 tons, nation-wide prohibition for the period of the war is absolutely essential.

The committee which formulated the statement laid before President Wilson by Fuel Administrator Garfield, is not composed of dreamers or visionary reformers. They are practical operating men representing varied personal opinions as to indulgence in intoxicating liquor. They came from wet States, from dry States and some from States partly wet and partly dry. They considered the subject frankly and fully and unanimously came to the decision in favor of national prohibition. The plain fact, in the opinion of the committee, is that "the country can not have both booze and sufficient coal this winter, nor can the country keep booze in the mining sections now and have enough coal later on." It is asserted that the liquor traffic is curtailing coal production and that the time has come to eliminate it. The committee says:

> Regardless of political affiliations of the members of the association and leaving out of consideration the moral issues involved, and basing its opinion entirely on economic and patriotic grounds, the committee unanimously and unqualifiedly believes that national prohibition for the period of the war is absolutely necessary to make effective this or any other plan for increased coal production. A comparison of the records of production of mines in wet and dry territories furnishes ample proof of the need of prohibition. The various instances cited to you need not be repeated here, but they typify the experience of operators throughout the entire country.

While members of the Senate and House are enjoying their vacations, they will do well to make a thorough investigation and find out whether intoxicating liquor is not having the same effect, or at least a similar effect, in all industries of the country that is so vigorously set forth by the National Coal Association.

Our Half-Yearly Index

The index of THE IRON AGE for the past half year, January to June inclusive, has been compiled and printed and is now ready for distribution. It will be forwarded promptly to those who have entered their names on our list as desiring it. Others who may have use for copies can secure them by addressing our Circulation Department.

In this issue of THE IRON AGE is published a description of the methods adopted by the Youngstown Sheet & Tube Co. in conducting free schools for its employees. The article is noteworthy because it not only gives an accurate idea of what is being done by the company, but points out definite results. Of course, there are some results which can never be measured, especially in making better citizens of those who attend the schools, but the inquiry made by the Youngstown company established the fact that the men who attended the schools were soon ranked among the most efficient workmen in their departments. Many well-meaning people write about Americanization in glowing terms, but do not give the practical information which employers are anxious to obtain and THE IRON AGE is glad to print.

Steel Ingot Output in June Shows a Falling Off from May

The daily rate of production of steel ingots in June showed a slight decrease from that for May, according to statistics compiled by the American Iron and Steel Institute from reports submitted by 29 companies which in 1916 made 88.14 per cent of ingot output. Only 3,036,930 gross tons was so reported for June, as against 3,287,233 tons, the revised figures for the month of May, and 3,083,929 tons for June, 1917. For the 25 working days in June the daily rate was 121,477 tons, as compared with 121,749 tons in May, and with 118,613 tons in June, 1917, a month of four Sundays. On the basis of these reports the June production represents an annual output of 42,588,500 tons, calculated for 309 working days, for the year. The table below gives the ingot production of these 29 companies for the past year in gross tons:

	Open Hearth	Bessemer	All other	Total
June, 1917	2,265,772	809,552	8,605	3,083,929
July	2,152,479	777,171	9,465	2 939,115
August	2,251,013	863,873	8,331	3,123,217
September	2,195,556	770,064	6,639	2,972,259
October	2,475,754	870,494	5,687	3,351,935
November	2,384,218	772,489	9,550	3,166,257
December	2,195,832	524,084	13,806	2,733,722
January, 1918	1,763,356	429,588	10,901	2,203,845
February	1,805,233	454,457	14,051	2,273,741
March	2,331,048	763,255	16,078	3,110,381
April	2,377,974	769,249	16,187	3,163,410
May	*2,475,131	796,244	15,858	*3,287,233
June	2,235,202	786,380	15,348	3,036,930

*Revised

The Algoma Steel Corporation, Ltd., Sault Ste. Marie, Ont., has issued a circular explaining the method of dealing with export licenses for products shipped to Canada. All inquiries regarding shipments to that company or licenses therefor are to be addressed to L. L. Jacobs, purchasing agent.

PROFITS TAX UP TO 80 PER CENT

Chamber of Commerce Committee's Report on Methods of War Financing

WASHINGTON, July 16.—A comprehensive taxing project with a levy on excess profits as high as 80 per cent is embraced in a report by a special committee on financing the war, of the Chamber of Commerce of the United States, which has just been submitted for a referendum vote to the 1100 business organizations throughout the country which compose the Chamber's membership. The report emphasizes the position heretofore taken by the Chamber against special profits arising from the war and points out the necessity of strict economy and the elimination of waste and extravagance. The specific recommendations of the report are as follows:

That exemptions allowed before war taxes are imposed should be adequate for the safe conduct of business enterprises and that power to make adjustments that will prevent inequities should be given to the administrative authority under the tax law.

That liberal provisions for amortization of plant used upon war work should be made, with opportunity for subsequent readjustment to correct errors.

That there should be a limited number of regional boards of review, appointed by the administrative authority and making recommendations upon appeals from preliminary assessments.

That there should be equalization of federal taxes.

That in computing taxable income corporations should be allowed to make two deductions (interest and charitable gifts) which they are now denied.

On condition that proper exemptions and opportunities for adjustment are allowed, that a war profits tax should be imposed at a high rate, and should be levied when it would exceed the excess profits tax.

That, upon the present general basis but with inequalities removed, the excess profits tax should be increased.

That rates of income taxes should be increased and unearned incomes should be taxed at least as much as earned.

Heavy taxes upon a few articles of widespread consumption.

Heavy taxes upon a selected list of luxuries.

Heavy taxes upon a selected list of war extravagances.

The committee approves the plan of the Treasury Department to raise by taxation eight billion dollars of the twenty-four billions estimated to be expended during the fiscal year just begun. "It is important," says the committee, "in considering present taxation to remember that the heavier the taxes which are now imposed the more rapidly can taxation be decreased after the war and the more advantageous the position of our country will be in that period of keen, international commercial competition when countries then bearing heavy burdens of taxation will be correspondingly handicapped. At present, however favorably the ratio of our taxes to our expenditures compares with the ratios of other countries, in such countries as England the rates of tax imposed are very considerably higher than our rates."

Concerning the recommendation for the authorization of a war-profits tax, the committee points out that the excess profits tax, although fruitful in revenue and apparently efficient as to four-fifths of our business concerns, has failed adequately to reach large profits due directly to the war which have been obtained by the other fifth. For this reason it is proposed to enact a war profits tax with exemption of a fair return as earned on capital or turnover, of sufficient spread, as a fair and equitable basis, but with a very high percentage of the excess turned over to the Government in taxes. This would not be additional to the existing excess profits tax, but in each case one or the other would apply accordingly, as the result in taxes would be greater. The committee suggests the desirability of maintaining the general basis of the present excess profits tax but with increased rates running perhaps to a maximum of 80 per cent instead of the present 60 per cent. In this connection it is pointed out that England taxes all war profits 80 per cent. In no case should the excess or war profits taxes be levied upon earnings necessary to permit a business to be carried on with safety or to make a reasonable return to stockholders.

In urging certain consumption taxes the committee points out that these taxes have a three-fold purpose: First, to secure revenue; second, to induce economy in the use of the commodities taxed, thus producing savings to be invested in bonds; and third, to reduce the demand for articles taxed so that materials, equipment and labor which otherwise would be employed to produce these commodities will naturally turn toward more essential employment. Some of the suggested consumption taxes are 20 cents per pound on tea, 8 cents on coffee, 50 cents on tobacco and on beer $10 per barrel. A moderate tax is proposed on the use of gasoline.

The committee also approves a suggestion made to the Ways and Means Committee by Professor Sprague of Harvard University for a large issue of so-called "economy bonds" heretofore described in this correspondence. An extra income tax of 10 per cent would be imposed with the privilege on the part of the taxpayer to avoid this additional tax by buying three or four times its amount in "economy bonds." These bonds would necessarily be purchased by people with large incomes who would thus have a strong inducement to avoid a heavy extra tax.

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First Government Pool on a Commodity

Bearing of the Federal Purchase of All Sugar on the Proposal for the Buying of All Iron and Steel on a Differential Basis

WASHINGTON, July 16.—Important action taken by the President during the past week providing for the formation of the first Governmental pool for the acquisition and distribution of a commodity of universal consumption has greatly stimulated the interest of prominent business men here in this form of Government control, and there is much speculation as to whether the steps taken foreshadow a similar arrangement as to iron and steel to take effect with the expiration of the special schedule of controlled prices on Sept. 30 next. Officials of the War Industries Board profess to have no information concerning any plans looking to the pooling of iron and steel, but it is conceded that the machinery now being provided for the execution of the recently expanded functions of the Director of Steel Supply would be largely available for the handling of a pool and would make it practicable to distribute the product of the industry at a flat price, while producers would receive differential rates showing comfortable profits on the output of every small high cost manufacturer entitled to exist even in this grave emergency when maximum production is the watchword of the hour.

Without warning and with no further legislation than is embodied in the Lever food, feed and fuel act the President on July 11 created a Federal corporation with a capital of $5,000,000 to organize and operate a pool for the purchase and distribution of the entire sugar crop of the United States and of all importations. In default of an appropriation the President supplied the capital of the new corporation from the war fund of $100,000,000 heretofore voted him by Congress, thus demonstrating the availability of that fund for such a purpose and foreshadowing its use for almost any war project the practicability of which would otherwise appear to depend upon appropriations by Congress.

Federal Trade Commission Activities Transferred to Fuel Administration

A short time before the sugar pool was authorized the President, acting under the almost limitless authority conferred upon him by the Overman act, transferred from the Federal Trade Commission to the Fuel Administration all the functions of the commission with respect to the coal industry, except research as to costs of production, etc., thus, at a single stroke of the pen, depriving the commission of a large part of its jurisdiction of this important matter and providing the Fuel Administrator with much of the machinery necessary to carry out the threat recently made by him to take over the coal mining industry and pool its output for the purpose of securing its distribution at fair prices.

Reports are already current that the President intends to avail himself further of the authority granted by the Overman act to distribute the functions of the Federal Trade Commission with respect to investigation, cost finding, etc., to the several bureaus having charge of the distribution of essential products and that the work heretofore done for iron and steel by the commission will soon be delegated to the War Industries Board, the transfer carrying with it a considerable corps of experts and accountants who heretofore have furnished the figures constituting the basis of discussion at all the price fixing conferences held between the board and representatives of the American Iron and Steel Institute. It is believed these reports lack foundation so far as any immediate action by the President is concerned, but there is sound basis for the statement that the work of the Federal Trade Commission is now undergoing careful scrutiny by the President and some of his aides with a view to co-ordinating certain of its activities with other bureaus to which they particularly relate. The commission would thus have left as its chief function the administration of the act by which it was created and such other matters as come within its jurisdiction pursuant to the provisions of the Clayton law.

The Sugar Pool and the Parallel with Steel

As the first comprehensive project for Governmental pooling the new departure with respect to sugar is arousing the liveliest interest in every quarter. The new organization will be known as the Sugar Equalization Board and will be regularly incorporated with George Rolph, sugar director of the Food Administration, as president. Food Administrator Hoover has been appointed chairman of the board of directors, which will consist of F. W. Taussig, chairman of the Tariff Commission; Clarence Woolley of the War Trade Board; George Zabriskie, Sugar Administrator, and Theodore Whitmarsh and William T. Glasgow, Food Administration officials. The new board will have authority to acquire all the sugar produced in the United States or that may be imported. It will not be limited as to the price it may pay and it is specifically authorized to acquire the output of certain domestic beet sugar factories at a price higher than such factories are now receiving and higher than the price at which this sugar will in turn be sold to the consumer. Owing to the lower cost of certain imported sugars that will be purchased, the board is expected to recoup itself for any loss on domestic purchases and the foreign market will be stabilized by joint dealings with the Allies in foreign sugars and the adjustment of differentials in overseas freight rates.

Experienced observers here point to the close parallel between conditions in the domestic sugar industry and in the manufacture of iron and steel as indicating the method of operation of any pool that might be authorized in the latter industry for the distribution of its products. In sugar, as in steel, there is unquestionably a shortage, although in sugar the deficit is due not so much to increased demand as to reduced production on account of the war. In both industries the importance of securing maximum production is greatly emphasized and this is to be attained as to sugar by the payment to the small beet factories of prices higher than those at which the product is to be resold to consumers. The bulk of the domestic cane sugar and all the imported sugars are to be acquired at prices that will show only the most reasonable profits to the producers.

Coal Industry May Be Taken Over

There is much speculation here as to the significance of the action taken by the President under the authority of the Overman act in transferring to the Fuel Administration certain functions and powers of the Federal Trade Commission respecting the coal industry. Under this order the Fuel Administration, "acting through duly authorized agents, examiners, employees, assistants and subordinates," is authorized to exercise in this connection all the powers of the Federal Trade Commission, and all persons, partnerships and corporations engaged in the production or distribution of coal or coke are required to furnish promptly whenever called for "any data or information" relating to their business.

The view generally taken here is that the President's action is a part of a general plan to put the coal industry in convenient shape to have it taken over and its product pooled on short notice whenever it appears to the Administration that the time for action has arrived. Coming almost immediately after Dr.

Garfield's significant warning that if controlled prices are not observed he will take over the mines, the President's order is regarded as the last word on this subject that is likely to be heard before Dr. Garfield makes good his threat.

It is an interesting coincidence to which attention is being called here that the coal pooling plan, to facilitate which it is believed an important contingent of the Federal Trade Commission has been transferred to the Fuel Administration, was originally suggested by Mr. Colver, at present the acting chairman of the commission. The scheme was first publicly discussed by Mr. Peabody, then chairman of the Coal Production Committee, in his testimony before the Senate Committee on Manufactures.

Director Replogle and Steel Costs

Quite apart from the question as to whether the Government in the near future will pool the output of the iron and steel industry is the possibility that the powers and functions of the Federal Trade Commission with respect to cost finding and other investigations may be transferred to Mr. Replogle's division of the War Industries Board. It is significant in this connection that the special price fixing committee of which Mr. Replogle is chairman recently held a long and altogether abortive conference with manufacturers of rails, wire rope and high speed tool steel, the failure of the Government and the manufacturers to get together being due in part to differences of opinion regarding costs, which probably would not have delayed final action had the cost figures been those of Mr. Replogle's division rather than of the Federal Trade Commission.

The arguments in favor of this transfer of functions are not being urged by radicals but rather by conservatives. It is pointed out that the Director of Steel Supply and his entire organization command the confidence of the steel manufacturers, which cannot be said of the Federal Trade Commission, especially since the withdrawal of Messrs. Davies and Harris, which leaves the organization in the hands of three men with a nation-wide reputation for extreme views. It is also urged that Mr. Replogle and his immediate assistants, and to a very great extent his entire organization, have had much practical experience in the iron and steel industry and therefore are regarded by manufacturers as being in far better position to deal with the technical problems involved in the work of cost finding, including the determination of invested capital, overhead expense, good will, etc., than the staff of the commission, the expertness and impartiality of which are open to serious doubt. W. L. C.

China to Build Four American Ships

WASHINGTON, July 16.—China will immediately start to build four steel ships of 10,000 tons each for the United States Government, according to an announcement by Chairman Edward N. Hurley of the United States Shipping Board. Negotiations are under way to extend the project to twelve ships of 120,000 tonnage, to cost between $25,000,000 and $30,000,000, it was stated. The total contract will involve the shipment of 40,000 tons of American steel for the construction of the ships. They will be laid down at the Shanghai yards of the Kiang-Nan Docking & Engineering Works. The yards are owned by the Chinese Government under the exclusive control of the Chinese board of navy. The Chinese Government promises to deliver the vessels six months after the steel has been received from the United States.

Charles M. Schwab announces that a department to distribute steel to the various shipyards under the care of the Emergency Fleet Corporation has been formed, with George M. Brill at the head.

The Federal Homes Building Co., Lorain, Ohio, has placed a contract with the Moren-Burkman Construction Co., St. Louis, for the construction of 240 houses for shipyard workers. These will be erected under the direction of the Emergency Fleet Corporation.

MORE WOMEN IN INDUSTRY

Statement of the Government's Attitude—Older Men Should Be Utilized

WASHINGTON, July 16.—The War Labor Policies Board has adopted a resolution setting forth the Government's attitude toward the employment of women in war industries. Its principles have been approved by all the production and distribution agencies of the Government and will be urged upon all manufacturers having war contracts. The Division of Women in Industry will be governed by this policy, which it will seek to extend in every possible direction. The resolution is as follows:

The existing shortage of labor, aggravated daily by the military and naval demands of the Government which require a greatly increased production of war materials and at the same time the withdrawal from civilian occupations of about a quarter of a million additional recruits each month, necessitates widespread recourse to the labor of women in the United States.

In order that their services may be fully utilized and their working power conserved, a clearly defined policy is needed which shall determine what kinds of work women should perform, how they should best be introduced, under what conditions they should be employed, and what work should be prohibited.

Standards as to hours, night work, wages and conditions of labor have already been provided by the Government in orders issued by the Chief of Ordnance and the Quartermaster-General, and in the recommendations made by the War Labor Board, which should be observed by all employers.

First. The shortage of labor in essential war industries should be met in part by further introducing women into occupations easily filled by them, such as clerical and cashier service and accounting in manufacturing, mercantile and financial establishments and in the offices of transportation companies and other public utilities; such as sales clerks and floor walkers in mercantile establishments, including among others department stores, specialty stores, shoe stores, men's furnishing stores, florists' shops, jewelry stores, drug stores, soda water fountains, etc.

Second. Women should not be employed to replace men in occupations or places of employment clearly unfit for women owing to physical or moral conditions, as, for instance, in bar rooms and saloons, in pool rooms, in or about mines, smelters and quarries, on furnace work in glass works, etc. In addition, girls under 21 years of age should not be employed in occupations or places of employment clearly unfit for them owing to their youth, as, for instance, in the public messenger service, in street car, elevated and subway transportation service, as elevator operators, as bell boys in hotels and clubs, etc.

Third. 1. The introduction of women into war industries or into employments involving special hazards, such as the use of industrial poisons, should be guided by the standards as to health, comfort and safety set up from time to time by the War Labor Policies Board, in addition to the standards already defined by the Federal Government and by State labor departments.

2. The introduction of women into new occupations such as street railway service, public messenger service, etc., should be guided by regulations concerning hours of labor, night work, etc. Such, for instance, as those adopted by the Industrial Commission of Wisconsin for street railroad service and by the legislature of New York State for messenger service.

3. The recruiting of mothers of young children for war industries should be discouraged.

4. The introduction of women into positions hitherto filled by men should not be made a pretext for unnecessarily displacing men.

Services of the Division of Women in Industry should be sought by employers to advise on best methods of introducing women, and the working conditions which should be established.

With a view to reducing the pressure for the recruiting of women for certain classes of labor, the War Labor Policies Board urges that older men should be more generally employed. "They constitute a largely unused labor reserve," says the board. "In the past they have been considered superannuated at early ages. It is estimated that since the war began the maximum age of engaging men has advanced ten to twelve years, that is, from about 38 to 50. It has been found that tasks can be graded for these workers according to their strength, and that work unsuitable for women, especially at night, can be performed by them. In many trades their experience is a valuable asset."

Iron and Steel Markets

OPEN-HEARTH STEEL TAKEN

War Needs Leave Only Bessemer for General Purposes

Plate Mill Output Heavy—Still No Agreement on Rail Prices

Washington has given no sign that ordinary consumers of steel will get larger allowances under the War Board's recent statement. Later checking of figures furnished by the Government and its Allies really narrows the margin between probable output in the second half of the year and the requirements for war. Leading steel manufacturers up to this week have taken the view that the situation would be easier in a few months. They are less confident of that now.

Actual procedure under the new classification of orders is not far from what has been followed. Some producers are even more exacting than before, now that they are asked by the Government to decide as to precedence in shipment.

The meeting of the steel producers' committee and the Director of Steel Supply in New York Monday brought no conclusion as to steel rail and other pending prices. Only 100,000 tons additional of rails are wanted for this year and the Railroad Administration wants the price fixed chiefly in view of large purchases to be made for 1919. The stand taken for a $42 price for Bessemer rails is in the face of an average cost of $50 or more and the contention of one producer that it should have $60 for Bessemer and $65 for open-hearth rails.

A possible solution of the rail controversy is the payment of different prices to different mills in view of widely differing costs. This might be worked, seeing that the Government will take nearly all the output.

The manufacturers' committee is expected to hold three meetings each week for some time in view of the questions constantly coming up as to price interpretations.

Additional schedules and rulings of the committee have been put out this week, making the lower standard of manganese content for ferromanganese and spiegeleisen apply only to the domestic product; extending control prices to certain forms of cast-iron scrap; fixing horse-shoe prices on a basis of $5.75 per 100 lb., and establishing prices on various classes of malleable castings.

It now appears certain that the open-hearth steel output of the country will be practically taken up by war and essential needs for the remainder of the year and that whatever permits are given for general or class D purposes must be filled almost entirely with Bessemer steel.

The plate mills keep on producing at a yearly rate of 6,000,000 tons, a recent week showing 114,000 tons, while new capacity may bring the rate up to 7,000,000 tons a year by January.

Wire companies are only putting 60 to 65 per cent of their steel into wire products, the remainder of their ingots being taken to be rolled into other forms. Besides 14,000 tons of rods for England recently entered, 11,000 tons will go to France, both presumably for civilian uses.

Data are being gathered on which a question may be raised with the British Mission as to the nature and extent of British exports of steel. The Canadian steel trade is involved in a measure also. Some Canadian steel has been sold in New England at high prices, to a non-essential industry, yet large shipments of American steel are being made to Canada at control prices. An amicable exchange on the whole question is possible, in view of the considerable amounts of American steel for which Great Britain has asked. Interesting in the same connection are recent reports of easier conditions as to steel supply in the Birmingham and Sheffield districts of England.

Tin plate production continues at a record rate. Sheet mills have been running at about 75 per cent. Some sheet producers are now accepting class C or preferred list orders. Jobbers also have been able to get 100-ton lots of sheets.

Jobbers are finding that they cannot replace their stocks except in so far as these went to fill war needs, and few warehouses are likely to get back to more than 50 per cent of normal tonnage.

The ruling has been made at Washington that permits must be secured for the shipment of discard shell steel, which is being bought to be rolled into an increasing number of forms; but it is added that the policy will be liberal.

Not in several years have cast iron pipe foundries had so dull a summer. Municipal financing has rarely been more difficult. Some of these foundries have turned to chemical and other special castings, but even with curtailed operation find labor scarce.

Pittsburgh

PITTSBURGH, July 16.—(*By Wire.*)

The situation as regards steel products which the mills are permitted to ship to the jobbers has been very much clarified by the action taken in Washington last week, under which the jobbers' pledge as printed on page 92 of THE IRON AGE of July 11. The pledge, after being signed by the jobbers and then filed with the Director of Steel Supply and the Priorities Committee, permits the mills to replenish stocks of jobbers which may have been shipped out in the filling of orders for war essentials. Before getting goods from a manufacturer, the jobber must also certify to the manufacturer that he has signed and filed this pledge with the proper authorities. However, the mills here interpret the new order of things to mean that shipments to jobbers in any one month shall not exceed in quantity the amount of goods shipped out by the jobbers in the previous month. In other words, it is the sense of the Director of Steel Supply that jobbers shall not be allowed to increase their stocks over what they were when the action on this matter was taken. Jobbers' stocks have been very low for some time, and under this order they

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron: Per Gross Ton:	July 16 1918	July 9 1918	June 18 1918	July 18 1917
No. 2 X, Philadelphia	$34.40	$34.40	$34.25	$54.50
No. 2, Valley furnace	33.00	33.00	33.00	55.00
No. 2 Southern, Cincinnati	36.90	36.90	35.90	49.90
No. 2, Birmingham, Ala.	33.00	33.00	33.00	47.00
No. 2, furnace, Chicago*	33.00	33.00	33.00	55.00
Basic, deliv., eastern Pa.	32.90	32.90	32.75	50.00
Basic, Valley furnace	32.00	32.00	32.00	53.00
Bessemer, Pittsburgh	36.60	36.60	36.30	57.95
Malleable Bess., Chicago*	33.50	33.50	33.50	55.00
Malleable, Valley	33.50	33.50	33.50	53.00
Gray forge, Pittsburgh	33.40	33.40	32.75	47.95
L. S. charcoal, Chicago	37.85	37.85	37.50	58.00
Rails, Billets, Etc.: Per Gross Ton:				
Bess. rails, heavy, at mill	55.00	55.00	55.00	38.00
O.-h. rails, heavy, at mill	57.00	57.00	57.00	40.00
Bess. billets, Pittsburgh	47.50	47.50	47.50	100.00
O.-h. billets, Pittsburgh	47.50	47.50	47.50	100.00
O.-h. sheet bars, P'gh.	51.00	51.00	51.00	105.00
Forging billets, base, P'gh.	60.00	60.00	60.00	125.00
O.-h. billets, Phila.	51.30	51.30	50.50	110.00
Wire rods, Pittsburgh	57.00	57.00	57.00	95.00
Finished Iron and Steel:				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	3.73	3.73	3.685	4.659
Iron bars, Pittsburgh	3.50	3.50	3.50	4.75
Iron bars, Chicago	3.50	3.50	3.50	4.50
Steel bars, Pittsburgh	2.90	2.90	2.90	4.50
Steel bars, New York	3.145	3.145	3.095	4.669
Tank plates, Pittsburgh	3.25	3.25	3.25	9.00
Tank plates, New York	3.495	3.495	3.445	10.169
Beams, etc., Pittsburgh	3.00	3.00	3.00	4.50
Beams, etc., New York	3.245	3.245	3.195	4.669
Skelp, grooved steel, P'gh.	2.90	2.90	2.90	4.00
Skelp, sheared steel, P'gh.	3.25	3.25	3.25	6.00
Steel hoops, Pittsburgh	3.50	3.50	3.50	5.25

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire: Per Lb. to Large Buyers:	July 16 1918 Cents	July 9 1918 Cents	June 18 1918 Cents	July 18 1917 Cents
Sheets, black, No. 28, P'gh.	5.00	5.00	5.00	8.50
Sheets, galv., No. 28, P'gh.	6.25	6.25	6.25	10.00
Wire nails, Pittsburgh	3.50	3.50	3.50	4.00
Cut nails, Pittsburgh	4.00	4.00	4.00	4.65
Fence wire, base, P'gh.	3.25	3.25	3.25	3.95
Barb wire, galv., P'gh.	4.35	4.35	4.35	4.85
Old Material: Per Gross Ton:				
Carwheels, Chicago	$29.00	$29.00	$29.00	$35.00
Carwheels, Philadelphia	29.00	29.00	29.00	35.00
Heavy steel scrap, P'gh.	29.00	29.00	28.50	38.00
Heavy steel scrap, Phila.	29.00	29.00	29.00	32.00
Heavy steel scrap, Ch'go.	29.00	29.00	29.00	32.00
No. 1 cast, Pittsburgh	29.00	29.00	28.50	32.00
No. 1 cast, Philadelphia	29.00	29.00	29.00	35.00
No. 1 cast, Ch'go, net ton	28.00	28.00	27.00	28.50
No. 1 RR. wrot., Phila.	34.00	34.00	34.00	48.00
No. 1 RR. wrot., Ch'go, net	29.75	29.75	29.75	37.00
Coke, Connellsville: Per Net Ton at Oven:				
Furnace coke, prompt	$6.00	$6.00	$6.00	$11.00
Furnace coke, future	6.00	6.00	6.00	10.00
Foundry coke, prompt	7.00	7.00	7.00	12.00
Foundry coke, future	7.00	7.00	7.00	10.00
Metals:				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	26.00	26.00	23.50	26.50
Electrolytic copper, N. Y.	26.00	26.00	23.50	26.50
Spelter, St. Louis	8.50	8.62½	7.75	8.62½
Spelter, New York	8.75	8.87½	8.00	8.87½
Lead, St. Louis	7.75	7.75	7.75	10.37½
Lead, New York	8.05	8.05	7.82½	10.50
Tin, New York	94.00	92.00	90.00	62.50
Antimony (Asiatic), N. Y.	13.00	13.00	13.50	16.00
Tin plate, 100-lb. box, P'gh.	$7.75	$7.75	$7.75	$12.00

will continue so until it is modified. On some lines of products, notably steel plates and other heavy materials, jobbers cannot expect to receive shipments from the mills for some time, but on the lighter lines of finished steel products, such as sheets, steel bars and shapes, tabular products, tin plate and other steel articles, the mills expect to have a surplus over actual Government needs that will serve to keep the jobbers in fairly comfortable position.

Nothing has been more of a factor in stimulating steel production than the cool weather of the past month or so, the rate of operation among blast furnaces, steel works, and most of the heavy finishing mills being very close to 100 per cent of normal. In tin plate, output is the heaviest ever known in the history of that trade, the American Sheet & Tin Plate Co. reporting splendid results from its 100 per cent efficiency plan put in force among the men at its sheet and tin plate mills recently, the results being far above expectations. In plates, the output is tremendous, and the effect of this has been the accumulation of heavy stocks of plates at nearly all the shipyards, some of the latter having asked plate mills to ease up on shipments, as their stocks were getting unwieldly. Purchases of steel products lately by the Government have been rather light. However, some heavy inquiries are in the market for pig iron for export shipment, and also for steel cars and locomotives. A recent order placed by the Government was for 27,000 kegs of wire nails, all of which has been allocated to the mills. All indications point to as close to a 100 per cent operation among the blast furnaces, steel works and finishing mills for the remainder of this year as can be secured. Some of the larger steel companies making a varied line of finished steel materials are sold up for the entire year, with prospects that they will carry over a large tonnage into next year. The labor supply is giving some concern, and this will likely grow worse in the near future. In some plants in the Pittsburgh district a great scarcity in supply of common labor is reported, many men having gone to work as common laborers at the Neville Island ordnance plant, believing that by so doing they would be exempt from the draft.

Pig Iron.—Considerable pig iron is being reallocated as a result of the survey of the pig iron trade made recently by the Committee on Pig Iron, Iron Ore and Lake Transportation, and some concerns claiming they are working on strictly war essentials have asked the committee for probably 10,000 tons more of basic iron and about 8,000 tons of bessemer, and the committee is now working these requests out. While the survey has not been officially completed, a few concerns having failed to report, it is practically finished and seems to be serving the purpose for which it was made. The Westinghouse Air Brake Co. is inquiring for upwards of 10,000 tons of foundry iron for Wilmerding, Pa., for the first half of next year. It is said part of the iron has been bought, but some furnaces do not care to quote so far ahead. There is no pig iron of any kind to be had in the open market, but all the steel producers would be very glad to buy iron if they could find it. Shipments are entirely under Government direction, and consumers who make complaints to furnaces about the cutting down of their supply of pig iron are very promptly referred to Washington for redress. The consumption of pig iron is heavier by some melters than usual owing to the trouble in getting scrap. It is said that some open-hearth steel plants are using fully 75 per cent of pig iron in their mixture for this reason.

Basic pig iron, $32; Bessemer, $35.20; gray forge, $32; No. 2 foundry, $33; No. 3 foundry, $32.50, and malleable, $33.50, all per gross ton at Valley furnace, the freight rate for delivery in the Cleveland and Pittsburgh districts being $1.40 per ton.

Billets and Sheet Bars.—No relief is in sight for the shortage in supply of billets and sheet bars, but, if anything, steel is getting scarcer right along. Formerly some mills were able to buy sheet steel discards freely,

but the supply of this grade of steel is now very small, the mills using it up themselves. Sheet and tin plate mills that buy bars in the open market report that at times they have only one or two days' supply ahead, and once in a while have to close down, waiting for steel to arrive. Very little open-hearth steel is being furnished to customers, either in billets or sheet bars, nearly all of it being Bessemer. No new steel capacity is in sight, and with the heavy consumption that will take place over the remainder of this year, it is evident the supply of steel will not be large enough to meet the demand.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $47.50, sheet bars $51, forging ingots $73, and forging billets $60 base, all f.o.b. at mill, Pittsburgh or Youngstown.

Ferroalloys.—The local inquiry is quiet, consumers being pretty well covered on all grades of ferroalloys for the remainder of this year. The supply of 50 per cent ferrosilicon has increased very much lately, and there seems to be no trouble in getting prompt shipments. A Youngstown, Ohio, interest is reported to have closed for 500 tons with the option of taking 1000 tons of spiegeleisen for last half of the year at $75 per gross ton at furnace. A sale of 300 tons of domestic 70 per cent ferromanganese, deliveries 50 tons per month, August to January, is reported at $250 delivered.

We quote 70 per cent ferromanganese at $250 delivered, 16 per cent spiegeleisen at $65 to $70 at furnace and 50 per cent ferrosilicon for prompt shipment at $160 and for delivery over the last half of the year, $150 to $155 at furnace, the furnaces usually absorbing the freight.

We now quote 9 per cent Bessemer ferrosilicon at $54; 10 per cent, $55; 11 per cent, $58.30; 12 per cent, $61.60. We quote 6 per cent silvery iron, $41; 7 per cent, $43; 8 per cent, $45.50; 9 per cent, $47.50; 10 per cent, $50. Three dollars per gross ton advance for each 1 per cent silicon for 11 per cent and over. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, these furnaces having a uniform freight rate of $2 per gross ton, for delivery in the Pittsburgh district.

Structural Material.—Practically all the new work being placed is for the Government and the awarding of commercial jobs is rare. The McClintic-Marshall Co. has taken 1200 tons for a roundhouse for the Pennsylvania Lines at McKees Rocks, Pa., and the American Bridge Co., 400 tons of bridge work for the Pennsylvania Railroad. It is estimated that Government active inquiries in the market at present run from 40,000 to 50,000 tons, and all this work is likely to be placed in the near future. The American Bridge Co., McClintic-Marshall Co., and two of the smaller steel fabricators here report that fully 90 per cent of work on their books now is for the Government. We quote beams and channels up to 15 in., at 3c. at mill, Pittsburgh, for third quarter delivery.

Plates.—The output of plates at present, owing to the pressure at which the mills have been running for some months, is the heaviest ever known. The Carnegie Steel Co. will very largely increase capacity for rolling plates at its Homestead Steel Works, and the Cambria Steel Co. started up recently a new plate mill at Johnstown with a capacity of 10,000 tons of sheared plates per month. More new capacity will be on the market shortly, the Brier Hill Steel Co. at Youngstown, Ohio, expecting to have two new plate mills ready for operation within 60 days, that will turn out 12,000 to 15,000 tons per month. The heavy deliveries of plates by the mills to the shipyards over the past few months are commencing to tell, some yards being congested with plates, and have asked the mills to slow down on shipments until accumulated stocks have been partly worked off. The Pressed Steel Car Co., and the Standard Steel Car Co. have started work on their portions of the Government order for 10,000 cars, the plates, shapes and bars for these cars to be furnished largely by the Carnegie Steel Co. It is said that, in the near future, some plates may be available for consumers who have been able to obtain very few for some time. We quote ¼-in. and heavier sheared plates for third-quarter delivery at 3.25c. at mill, Pittsburgh.

Tin Plate.—The output of tin plate in June has been estimated at slightly over 3,000,000 boxes by the entire industry in spite of the fact that there were five Saturdays and five Sundays in June, and on Saturdays the men work only three turns, getting through about noon on that day. The output for the first half of this year was slightly over 17,000,000 boxes, but a still larger output is looked for by the mills in the second half. The tin plate makers fully believe they will be able to entirely meet the heavy demand of the Government and can makers for tin plate for pure food containers. The action of the War Industries Board in requesting that the mills do not accept new orders for tin plate to go into the manufacture of what are termed non-essentials is regarded as being a very wise move, as it will divert a large quantity of tin plate to the making of cans for food containers. The American Sheet & Tin Plate Co., Jones & Laughlin Steel Co., and other large makers of tin plate report they are running very close to 100 per cent, and expect to keep this up over the remainder of this year. The sub-committee on pig tin sent out a notice under date of July 10, warning American consumers of pig tin against the use of their names by several importers and dealers in pig tin, who stated they could secure pig tin from England, but this action was not countenanced by the War Industries Board or the War Trade Board, and will not be permitted by these two bodies. It is believed the supply of pig tin will be ample to meet all demands this year, but whether it will be large enough next year is a matter of some doubt. The demand for terne plate is very quiet. We quote tin plate for third quarter delivery, made from Bessemer or open-hearth steel at $7.75 per base box, f.o.b. Pittsburg. Prices on terne plate for third quarter are given on page 179.

Wire Rods.—It is believed the Government will shortly be in the market for considerable quantities of soft rods, partly for domestic use, and some for export to France and England. Makers of rods have been asked to indicate whether they will be able to furnish rods on such inquiries and in what quanitity. Several local makers whose output has been very materially cut down on account of shortage of steel, will not likely have any rods to share over the remainder of this year, and in fact are hardly turning out enough to meet the needs of their own wire mills. One local maker of rods has practically discontinued their manufacture and is now engaged nearly entirely in turning out other war-essential products. There is some export inquiry for rods, largely from Canada, but local makers are not quoting. Prices on rods for third quarter are given on page 179.

Wire Products.—The General Engineer Department at Washington through the sub-committee of wire products has asked the mills for bids on 27,420 kegs of wire nails, 16d to 60d, and also on 2500 kegs of staples. One local mill has bid on about 25 per cent of the order, and another mill on about 20 per cent. Slightly higher than $3.50 per keg, base, has been quoted on the nails, as they are to be put up in extra strong packages for export to France, for which an extra is charged. The Committee on Steel and Steel Products has allocated 8500 tons of barbed wire for shipment to France. Mills now state they will make shipments of wire and wire nails to jobbers when they certify that they have filled out the pledge and sent it to the proper authorities at Washington. It is understood, however, that shipments of wire products to jobbers in any one month will not be heavier than the shipments made by such jobbers in the previous month, the idea being that jobbers' stocks of wire and wire nails are not to be increased. The commercial demand for wire and wire nails is very heavy, local mills saying they are refusing orders every day, being unable to fill them. Local mills are well sold up, mostly on Government direct and indirect orders, over the next three or four months. Prices on wire products are given on page 179.

Hoops and Bands.—The demand for hoops for cooperage purposes is very active, and is taking a good part of the present limited output. The demand is also active for steel bands, but Government orders recently have been light, and mills say they have a fair supply of both hoops and bands available for the commercial trade, when priorities certificates are furnished. We quote steel hoops and steel bands at 3.50c. per lb., f.o.b. Pittsburgh, for third-quarter delivery. Extras and

differentials in effect on hoops and bands were given in full on pages 1357 and 1374 of THE IRON AGE of May 23.

Cotton Ties.—The output of cotton this year is estimated at 15,000,000 bales and makers of cotton ties state they expect to be able to furnish a full supply of cotton ties needed for this large crop.

Shafting.—On the smaller sizes of shafting, the new demand is quiet, these sizes being used largely by the screw stock, machine and automobile trades. On the larger sizes running from 1½ and 5 in., these sizes being used largely in the manufacture of war essentials, the demand is very heavy, and makers are sold up for three or four months. We quote cold-rolled shafting at 17 per cent off in carloads, and 12 per cent in less than carloads, f.o.b. Pittsburgh for third-quarter delivery.

Nuts and Bolts.—A largely attended meeting of makers of nuts and bolts was held in this city on Friday, July 12, instead of at The Thousand Islands on July 1, as originally scheduled. Matters of interest to the nut and bolt trade were fully discussed and makers expressed the belief that by having Government and also commercial orders placed with the plants located nearest to point of delivery, considerable saving would be effected in freight rates, labor and time. Makers reported they are sold up, mostly on Government direct and indirect orders for several months, and also that the commercial demand is very heavy. Orders are being refused nearly every day which makers are unable to fill. Discounts on nuts and bolts for third quarter are given on page 179.

Rivets.—The output of rivets is limited owing to shortage in supply of steel and is probably not over 75 per cent of normal. The demand for ship rivets is very active, and makers are sold up on these for some months. The commercial demand is also heavy.

Spikes.—Makers report the demand for small spikes as being very heavy, but for boat and barge spikes is not as active as some time ago. The demand for railroad spikes is quiet and none of the roads is making contracts. It is believed the Government will shortly be in the market for heavy inquiries for spikes for the rails it is expected to place in the near future. Makers say that if the railroads would adopt a standard type of spike it would help a great deal, and would effect a material saving in cost and also in steel. As it is now, nearly every prominent railroad has its own standard of spike, and this prevents the makers from accumulating any stocks, which they would be able to do if a standard type of spike were used by all the roads. We quote:

Standard sizes of railroad spikes 9/16 x 4½ in. and larger, $3.90 per 100 lb. in lots of 200 kegs of 200 lb. each, or in larger lots. Boat spikes, $5.25 per 100 lb., track bolts, $4.90 base in lots of 200 kegs or more; less than 200 keg lots, $1 per 100 lb. extra. All f.o.b. Pittsburgh.

Hot-rolled Strip Steel.—The demand is only fair, and orders from the Government have been light for some time. The restricted output of cold-rolled strip steel is cutting the demand down for hot-rolled steel very materially. We quote hot-rolled strip steel at $3.50 per 100 lb., f.o.b. Pittsburgh, for third quarter delivery.

Cold-rolled Strip Steel.—The demand from the Government and also from the commercial users of cold-rolled strip steel is rather light. None of the makers is operating full time owing to scarcity in supply of steel, output not being over 60 to 70 per cent of normal.

We quote cold-rolled strip steel at $6.50 per 100 lb., f.o.b. Pittsburgh, terms 30 days, less 2 per cent for cash in 10 days when sold in quantities of 300 lb. or more. Freight is allowed to destination when it does not exceed 31c. per 100 lb.

Iron and Steel Bars.—Government orders and also contracts with implement makers and other concerns working on war essentials are taking very close to 100 per cent of the output of steel bars, and this condition is likely to last over the remainder of this year. However, it is believed that before long some steel bars will be available for consumers not working on strictly war essentials, and whose supply has been practically cut off for some time. The Government demand for iron bars is not so urgent, and some mills can take orders from the commercial trade for a limited quantity and for fairly prompt delivery.

Skelp.—Mills report they are sold up for the remainder of this year, and are turning away orders frequently, on which they are unable to quote. Prices in effect for third quarter are as follows:

We quote grooved skelp at $2.90; universal skelp, $3.15, and sheared skelp, $3.25 base. Special skelp for boiler tubes, etc., is $3.40 for base sizes and $3.55 for other sizes, all prices being per 100 lb., f.o.b. Pittsburgh.

Sheets.—As noted in our report of last week, sheet mills with Government direct and indirect orders and commercial orders on their books are well sold up through October, and several of the larger mills that are devoting more energy to the manufacture of tin plate than sheets and making a limited output of the latter are sold up for practically the remainder of this year.

Wrought Pipe.—Mills rolling iron and steel pipe are replacing stocks of jobbers as promptly as possible to cover shipments made by jobbers to consumers working on Government direct and indirect orders. The mills require in all cases that the jobbers satisfy them that they have supplied the material to essential consumers, and when this is the case, do not ask for priority certificates.

Boiler Tubes.—The new demand for iron and steel tubes has been very heavy for months, largely for Government purposes, and mills are sold up for remainder of this year, and some into the first quarter of next year. On seamless steel tubes, two local makers are sold up for the next year. Discounts on iron and steel tubes for third quarter are given on page 179.

Coke.—There is no longer any complaint from blast furnaces over slow deliveries of coke, and some furnaces have been able to accumulate fairly large stocks. Output of coke in the upper and lower Connellsville regions for the week ending July 6 was 349,895 tons, a decrease of 2,695 tons from the previous week, largely due to the holiday on July 4. We quote 48-hr. blast furnace coke at $6; 72-hr. foundry coke at $7, and crushed coke from 1 in. size at $7.35, all in net tons at oven.

Old Material.—Local dealers report a slight increase in the available supply of scrap, and also state that it is easier to obtain cars for shipment than for some time. A fair amount of scrap is being brought to this district from other scrap producing centers, local consumers being willing to pay the excess freight in order to secure it. Prices on borings are firmer, and mills are now willing to pay the full regular price for them. The demand for scrap is largely confined to heavy melting steel, borings and turnings and low phosphorus stock. Railroads continue to sell their scrap direct to consumers, dealers being able to obtain very little of it. Prices, as fixed by the Government, are very firm, and consumers are perfectly willing to pay the 3½ per cent commission, when dealers can obtain scrap for them.

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	$29.00
No. 1 cast scrap (for steel plants)	29.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., Franklin, Pa., and Pittsburgh	34.00
Hydraulic compressed steel scrap	29.00
Bundled sheet scrap, sides and ends, f.o.b. consumer's mills, Pittsburgh district	$27.50 to 29.00
Bundled sheet stamping scrap	22.00 to 23.00
No. 1 railroad malleable scrap	28.00 to 29.00
Railroad grate bars	18.00 to 19.00
Low phosphorus melting stock (unguaranteed)	34.00
Low phosphorus melting stock (guaranteed)	36.50
Low phosphorus melting stock (bloom and billet ends, heavy plates)	39.00
Iron car axles	46.00 to 46.50
Locomotive axles, steel	46.00 to 46.50
Steel car axles	46.00 to 46.50
No. 1 busheling scrap	28.00 to 29.00
Machine shop turnings	19.00
Cast iron wheels	29.00
Rolled steel wheels	36.00
Sheet bar crop ends (at origin)	35.00
Cast iron borings	19.00
No. 1 railroad wrought scrap	34.00
Heavy steel axle turnings	34.00
Heavy breakable cast scrap	28.00 to 29.00

Chicago

CHICAGO, July 15.—(*By Wire.*)

Production of steel is at a better rate than that of a month ago, while demands on the mills are correspondingly heavier, but it is all allocated business, or supplying Government needs sanctioned by priority certificates. The rail situation is becoming acute, and reports have it that some re-allocation of shell steel is likely to permit more attention being given to rails. Jobbers are still having their troubles getting material. A few who had practically no stock in June cannot replace what they did not sell to war or preferred industries, and this is all they are permitted to do. Again, they seek material with priority orders which do not rank sufficiently high and cannot compete with class AA or class A. Some relief may come for them when the country's supply of steel is balanced against war needs, an operation which Director of Steel Supply Replogle is now understood to have in hand. Companies which have been doing an export business in sheets have abandoned efforts in that direction because of the numerous complications. The Symington-Chicago Corporation has been investigating the local sheet steel situation, as Chicago is its natural source of supply. It is reported that the Haskell & Barker Car Co., Inc., has been awarded a lot of cars for France which will require about 7000 tons of material. Effective July 12, all makers of bolts and nuts will quote on the Pittsburgh base and not grant any freight allowances, a practice which has heretofore caused confusion. The East continues to seek scrap steel in this market, while the local demand is good.

Pig Iron.—Producers are concentrating on shipping and giving special attention to orders for iron needed in war work. The number of letters from J. L. Replogle, Director of Steel Supply, requesting that such shipments be expedited is steadily increasing. Any surplus of iron which ordinarily would come on the market is being disposed of in this way. Inquiry has lessened in volume with the realization that Government intervention is essential to secure delivery for other than for war work. Meanwhile there are no offerings, sellers being under no necessity of soliciting business. The production of Southern foundry will be curtailed by the making of basic for export to the Allies. Up to the present, no reports have come to light of any shut down of foundries for want of iron, but some of them are turning more to cast scrap.

The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable, and steel-making irons, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 2 to 5	$38.00
Lake Superior charcoal, No. 6 and Scotch	$39.50 to 41.00
Northern coke foundry, No. 1	33.50
Northern coke foundry, No. 2	33.00
Northern coke foundry, No. 3	32.50
Northern high-phosphorus foundry	33.00
Southern coke, No. 1 foundry and No. 1 soft	39.50
Southern coke, No. 2 foundry	38.00
Malleable	33.50
Basic	32.00
Low phosphorus (copper free)	53.00
Silvery, 7 per cent	46.20

Ferroalloys.—The market is quiet. Seventy per cent ferro manganese is quoted at $250 delivered. Spiegeleisen, 16 to 18 per cent, remains at $75 furnace, and 50 per cent ferrosilicon at $150 to $160, delivered.

Structural Material.—Making authorized shipments absorbs the mills. Incidentally the jobbers are getting but little material despite the recent ruling in their case. Some of them had practically no stocks in June, consequently sold but little, and can replace but little, correspondingly. The American Bridge Co., will fabricate 365 tons for naval air station buildings of the Government at San Diego, Cal. The Dufflin Iron Works will supply 452 tons of fabricated steel for the forge shop and tool room of the Symington-Chicago Corporation, Chicago, which has begun the erection of a great shell plant. The main building will be 350 x 2100 ft. It will be one story, and partly constructed of brick and wood. The company has inquiries out for several hundred tons of steel additional. A bidder, name not reported, will supply 129 tons for gantry cranes to be erected for the American Shipbuilding Co., Cleveland. The Vierling Steel Co. will fabricate 145 tons for an extension to the Chicago freight car repair shop of the Lake Shore & Michigan Southern Railroad.

The official mill quotation is 3c., Pittsburgh, which takes a freight rate of 27c. per 100 lb. for Chicago delivery. Jobbers quote 4.27c. for material out of warehouse.

Bolts and Nuts.—Freight allowances will be abolished and henceforth all the makers of bolts and nuts will quote f.o.b. Pittsburgh, the ruling having become effective July 12. The new basis is expected to eliminate the many irregularities which resulted from the practice of granting freight allowances which caused confusion. Some makers allowed freight to Chicago and others to the Mississippi River, for example. The change will establish a uniform basis for all consumers. The demand grows heavier, while the supply of steel grows more dubious. Even where priority is bad, there are delays in delivery which threaten interruption to production. Only work for preferred industries is considered. For prices and freight rates see finished iron and steel, Pittsburgh, page 179. Jobbers quote:

Structural rivets, 5.67c.; boiler rivets, 5.77c.; machine bolts up to ⅞ x 4 in., 37½ per cent off; larger sizes 25 and 5 off; carriage bolts up to ⅞ x 6 in., 32½ off; larger sizes, 20 off; hot pressed nuts, square, tapped, $1.05 off; hexagon, tapped 85c. per 100 lb.; coach or lag screws, gimlet points, square heads, 40 per cent off.

Bars.—Some re-allocation of shell steel is expected to enable the mills to turn out more rails. Mild steel bars can be had only where priority has been sanctioned. Bar iron continues to improve slowly, mill bookings showing an improvement over a month ago, but the mills have not enough business in iron to keep them running full, and they alternate with discard shell steel and re-rolling rails. The latter are extremely scarce, and business in high carbon bars rolled from them is being turned down.

We quote, mill prices, mild steel bars at 2.90c., Pittsburgh, taking a freight rate to Chicago of 27c. per 100 lb. Bar iron is quoted at 3.50c., Chicago, and rail carbon at 3c., Chicago, a leading maker having adhered to Chicago as the basing point. Jobbers' prices follow:

Soft steel bars, 4.17c.; bar iron, 4.17c.; reinforcing bars, 4.17c., base. No extra charge for twisting ¾-in. and over; 2½c. for twisting ⅝, 11/16, ½ and 9/16; 5c. for 7/16 and ⅜; 10c. for 5/16 and 15c. per ¼-in. Extras as per card are charged for small sizes. Shafting, list plus 13 per cent.

Plates.—No change in the general situation can be reported. The leading independent continues to give all its production to Japan for shipbuilding, and the leading producer is overloaded with the requirements of this Government for ships, cars, etc.

The official mill quotation is 3.25c., Pittsburgh, the freight to Chicago being 27c. per 100 lb. Jobbers who have stock quote 4.52c.

Cast Iron Pipe.—On July 17 Kansas City is expected to place 2500 tons. The Cleveland inquiry for about 600 tons is pending. Manitowoc, Wis., placed about 90 tons with James B. Clow & Sons. We quote per net ton, Chicago, as follows: Water pipe, 4 in. $65.05; 6 in. and larger, $62.05.

Rails and Track Supplies.—The call for standard section rails is becoming urgent, and shell steel is expected to be re-allocated to some extent to permit of a greater output of rails. More inquiry is coming out for spikes and track bolts. We quote:

Standard railroad spikes, 4.11½c., Chicago. Track bolts, with square nuts, 5.11½c., Chicago. Tie plates, steel, 3.25c.; tie plates, iron, 3.75c.; f.o.b. maker's mill. The base for light rails is 3c. f.o.b. maker's mill for 25 to 45-lb. sections, lighter sections taking Government extras.

Sheets.—Where a manufacturer can pledge that the sheets he asks for are to be used for Government purposes, he may get them, otherwise not. The leading independent is operating at slightly under 75 per cent of capacity. It has been exporting to some extent, but has stopped business in this direction in view of the numerous complications involved. We quote No. 28 black sheets at 5c.; No. 10 blue annealed at 4.25c., and No. 28 galvanized at 6.25c., all Pittsburgh.

Chicago delivery out of stock, regardless of quantity, No. 10 blue annealed, 5.52c.; No. 28 black, 6.52c., and No. 28 galvanized, 7.77c.

Wire Products.—Business is fairly smooth, both consumers and jobbers being supplied under the limitations imposed by the Government. It is intimated that a

modification of the present method of distribution may be expected in a day of two, but it is not said how the consuming trade will be affected by the changes. For prices, see finished iron and steel, f.o.b. Pittsburgh, page 179.

Old Material.—For steel scrap there is great demand, and there is not too much to be had. Eastern mills continue to invade this market, while the local demand is good also. Dealers have no trouble in selling heavy melting and shoveling steel at the maximum price, plus the commission of 3½ per cent. Malleable bringing top prices, and cast continues to pick up, but rolling mill grades lag. There is a tendency on the part of most grades to work to maximum prices. Three or four railroad lists are out, but altogether they do not amount to much.

We quote for delivery in buyers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	$39.00
Relaying rails	55.00 to 60.00
Old carwheels	29.00
Old steel rails, rerolling	34.00
Old steel rails, less than 5 ft.	34.00
Heavy melting steel	29.00
Frogs, switches and guards, cut apart	29.00
Shoveling steel	29.00
Steel axle turnings	24.00
Per Net Ton	
Iron angles and splice bars	$34.82
Iron arch bars and transoms	41.50
Steel angle bars	$29.00 to 30.00
Iron car axles	41.52
Steel car axles	41.52
No. 1 railroad wrought	29.75 to 30.36
No. 2 railroad wrought	27.75 to 28.25
Cut forge	27.75 to 28.25
Pipes and flues	24.50 to 25.00
No. 1 busheling	26.25 to 26.75
No. 2 busheling	18.00 to 18.50
Steel knuckles and couplers	30.36
Coil springs	30.36
No. 1 cast scrap	28.00 to 28.50
Boiler punchings	32.00 to 33.00
Locomotive tires, smooth	40.50 to 41.52
Machine-shop turnings	15.75 to 16.25
Cast borings	16.50 to 16.96
Stove plate and light cast scrap	23.25 to 23.75
Grate bars	23.00 to 23.50
Brake shoes	24.00 to 24.50
Railroad malleable	29.50 to 30.36
Agricultural malleable	28.50 to 29.50
Country mixed scrap	21.00 to 21.50
No. 1 boilers cut to sheets and rings	25.00 to 26.00

St. Louis

ST. LOUIS, July 15.

Pig Iron.—Sales made during the week were very few and of small lots of surplus or off-analysis iron for spot delivery or nearby shipment, ranging around 100 tons. Such as proved available was snapped up quickly, and evidence continued to multiply that melters would readily take everything that offered. No developments have taken place in the survey of industries which have as yet enabled concerns without Government business, or with small orders therefor on hand, to increase their operations, but this is expected to take place shortly, as the regional survey progresses and the facilities available become more definitely known. Domestic work under way is at the minimum because of the Government restrictions, and war work is needed to keep organizations intact.

Coke.—No new business of consequence appears in the market, so far as transactions go, on account of the sold up condition of the ovens, beehive and by-product. Domestic coke contracts recently made have also almost entirely absorbed capacity for that product, leaving the market in a deadly uninteresting state.

Finished Iron and Steel.—Finished products show no change or features of interest, the conditions remaining as they have been for some weeks. The warehouses are censoring orders for materials carefully, and practically no material gets out to consumers unless for very vital domestic use or Government requirements, direct or indirect. We quote for stock out of warehouse as follows: Soft steel bars, 4.24c.; iron bars, 4.24c.; structural material, 4.34c.; tank plates, 4.59c.; No. 8 sheets, 5.54c.; No. 10 blue annealed sheets, 5.59c.; No. 28 black sheets, cold rolled, one pass, 6.59c.; No. 28, galvanized sheets, black sheet gage, 7.84c.

Old Material.—In the scrap market, although there is a good demand, especially from the rolling mill interests, there is a disposition to go slow on the part of the dealers on account of the terminal shipping or switching rate situation, which is in a state of negotiation and which it is hoped to settle in some way before long. There are reported to be indications of a disposition on the part of the Terminal Association to modify its attitude, but as the system is under Government control, it is expected to take some time before a settlement can be finally reached, though efforts are being made to push the matter. Lists out during the week included 600 tons from the cotton belt, 1800 tons from the Missouri, Kansas & Texas and 900 tons of rerollers melting rails from the Terminal Association. Such of the material as has been sold went at Government prices. We quote dealers' prices, f.o.b. customers' industrial works, St. Louis industrial district, as follows:

Per Gross Ton	
Old iron rails	$37.00 to $37.50
Old steel rails, rerolling	33.50 to 34.00
Old steel rails, less than 3 ft.	31.00 to 31.50
Relaying rails, standard sections, subject to inspection	55.00 to 65.00
Old carwheels	28.50 to 29.00
No. 1 railroad heavy melting steel scrap	28.50 to 29.00
Heavy shoveling steel	27.00 to 27.50
Ordinary shoveling steel	26.50 to 27.00
Frogs, switches and guards, cut apart	28.50 to 29.00
Ordinary bundled sheet scrap	23.00 to 23.50
Heavy axle and tire turnings	20.50 to 21.00
Per Net Ton	
Iron angle bars	$33.00 to $33.50
Steel angle bars	27.00 to 27.50
Iron car axles	40.00 to 40.50
Steel car axles	40.00 to 40.50
Wrought arch bars and transoms	40.00 to 40.50
No. 1 railroad wrought	28.50 to 29.00
No. 2 railroad wrought	27.50 to 28.00
Railroad springs	29.50 to 30.00
Steel couplers and knuckles	29.50 to 30.00
Locomotive tires, 42 in. and over, smooth inside	37.00 to 37.50
No. 1 dealers' forge	26.00 to 26.50
Cast iron borings	16.00 to 16.50
No. 1 busheling	25.00 to 25.50
No. 1 boilers, cut to sheets and rings	22.50 to 23.00
No. 1 railroad cast scrap	25.50 to 26.00
Stove plate and light cast scrap	21.50 to 22.00
Railroad malleable	26.00 to 26.50
Agricultural malleable	25.00 to 25.50
Pipes and flues	23.00 to 23.50
Heavy railroad sheet and tank scrap	22.50 to 23.00
Railroad grate bars	20.00 to 20.50
Machine shop turnings	16.00 to 16.50
Country mixed scrap	19.50 to 20.00
Uncut railroad mixed scrap	23.50 to 24.00

San Francisco

SAN FRANCISCO, July 9.

The question of wages again came to the fore this week in the demand of the Iron Trades Council that a meeting be called wherein it could present evidence that the cost of living had advanced materially since the first of the year, when the last adjustment was made. As a consequence a conference is now on between representatives of the council, the California Metal Trades and the Foundrymen's Association. It is expected that no agreement will be reached for a week or more and that if any change is made it will become effective from Aug. 1.

The scrap situation still dominates the iron and steel trade in this section. Commissioner Emory E. Smith is rapidly getting his organization perfected, and it is believed that he will have the situation well in hand in the course of another week. In the meantime there is a decided scarcity in the hands of the dealers, who say that they cannot get scrap to sell at Government prices. It is alleged that some sales are being made at a price higher than the Government schedule. A case is cited of as recent a date as July 2, when a San Francisco scrap dealer bought 300 tons of certain scrap at Nevada City, Cal., paying therefor $28.50 per net ton delivered in San Francisco. The facts of the case are in the hands of Mr. Smith. The Pacific Coast district, in

which Mr. Smith has been given control, is made up of Washington, Oregon, California, Nevada, Utah, western Colorado, New Mexico, Arizona and western Texas, including therein nine open hearth furnace plants and about 100 foundries. These mills and foundries depend almost exclusively on scrap for their raw material. A number of these foundries have not enough material on hand to last a week, while some are running on the receipts coming in from day to day. It would seem inevitable that some of the foundries, especially those not doing important Government work, must close down their plants.

Bars.—The market for bars shows no change this week. The local mills are turning out their normal amount, which is practically absorbed in the Government work.

Structural Materials.—The jobbers report that their stocks of angles and shapes are getting very low. On small shapes, they say the situation with them is even more serious than on other materials.

Plates.—The fact that the Government has relaxed its control of the industry to the extent that small lots not exceeding five tons of steel may be sold for civilian use on permission from Washington inclines the jobbers to believe that there is a tendency towards an easier market for plates and sheets and possibly for small structural shapes.

Sheets.—The stocks in the jobbers' hands continue depleted. It is understood that some plan is in process of being worked out whereby the jobbers may keep a stock on hand. This plan, it is believed, will include a better distribution of all materials handled by them, so that at least all war needs may be promptly met.

Wrought Pipe.—While there is very little wrought pipe arriving for jobbers' stocks, all the needs of the shipbuilders are being promptly taken care of, and the necessities of the oil fields are being closely guarded. In the latter business, but little wrought pipe is available for prospecting work, but so far there has been no serious shortage of pipe for use on the proven grounds.

Cast Iron Pipe.—Some inquiry has developed recently from the Pacific Northwest, but no deals of importance are reported. The future of cast iron pipe seems bright, as a large number of workmen's homes will have to be built in the neighborhood of the shipyards before next winter. These homes will take a good many carloads of pipe to equip. The Pacific Coast Shipbuilding Co., Bay Point, will probably be the first of these new yards to put up buildings for their workmen. The United States Cast Iron Pipe & Foundry Co. has already closed a contract to furnish this pipe.

Pig Iron.—There is no change in the pig iron situation. All the receipts are on old contracts, some of which are said to be about to expire.

Coke.—The coke situation remains unchanged. The stocks accumulated before the stringency became severe are about exhausted. No new contracts for definite delivery are reported.

Old Materials.—Emory E. Smith, commissioner for iron and steel scrap for the American Iron and Steel Institute, Pacific Coast district, makes the announcement that he has organized the work in the Los Angeles district and that the districts in San Francisco, Portland, Ore., and Seattle will be organized during the present week. Salt Lake will be taken up at a later date and organization perfected there as soon as possible. In San Francisco permanent offices have been opened in the United States Shipping Building. Mr. Smith has issued a statement calling upon all persons having scrap cast iron or steel in their possession to make it available for war purposes at the Government prices; and also calling upon all persons having knowledge of the hoarding of scrap to report the matter immediately. The trade has every confidence that Mr. Smith will get the scrap needed for mills and foundries working on Government contracts.

British Steel Market

Price of Cleveland Pig Iron Advanced—Further Restrictions in Merchant Steel

(*By Cable*)

LONDON, ENGLAND, July 17.

An advance of 6s. has been made in the export price of Cleveland pig iron. There is an active demand for hematite iron. Semi-finished steel is unsettled. Further permit restrictions for merchant steel are contemplated. The controlled base price of wire rods is £21 10s. net. Offerings of tin plate are lacking with the quotation at 32s. 10½d. The ferromanganese market is unchanged. We quote as follows:

Tin plate, coke, 14 x 20; 112 sheets, 108 lb., f.o.b. Wales, 32s. 10½d.
Ferromanganese, $250 to $260, c.i.f. for export to America; £26 10s. for British consumption.
Ferrosilicon, 50 per cent, c.i.f., £35 upward.
On other products control prices per gross ton are:
Hematite pig iron, East Coast, £6 2s. 6d.; West Coast, £6 7s. 6d.
Cleveland pig iron, £5 5s. for No. 1 and £6 6s. for basic.
Steel plates, ship, bridge and tank, £11 10s. to £17, according to size.
S. M. boiler plates, basis, £12 10s.
Bar iron, standard quality, basis £13 17s. 6d.; marked, £16.
Sheet and tin plate bars, £10 7s. 6d.
Blooms and billets for rerolling (ordinary), £10 7s. 6d.; special quality, £11.
Wire rods, £21 10s. net, basis.

Buffalo

BUFFALO, July 15.

Pig Iron.—There is a large aggregate tonnage of new inquiry for all grades, including a considerable amount for 1919 delivery; but producers are considering the taking on of commitments for extended future deliveries, inasmuch as both prices and shipments will be under Government control, and no output could be contracted for with certainty except for Government uses. All orders taken for some time past have been stipulated to be subject to the continuance of operation of furnace and ability to obtain coke and other supplies, labor, etc. Furnacemen are assimilating instructions contained in a notice from the War Industries Board dated July 3, but only recently received, stating that it has been decided not to issue priority certificates on pig iron, but to allow the producer to distribute his product—aside from specific allocations made by the local sub-committee—in accordance with the schedule of preference needs which will be issued shortly. The Troy furnace of the Buffalo Union Furnace Co. has been placed in operation on ferromanganese. The price schedule remains as follows, f.o.b. Buffalo:

No. 1 foundry, 2.75 to 3.25 silicon	$34.50
No. 2 X, 2.25 to 2.75 silicon	33.50
No. 3 foundry, 1.75 to 2.25 silicon	32.50
Gray forge	32.00
Malleable	33.50
Basic	32.00
Lake Superior charcoal, regular grades, f.o.b. Buffalo	37.50

Finished Iron and Steel.—Government instructions have been issued to jobbers for replenishment of stocks, under conditions whereby the jobber is to sign a pledge, which is sent in duplicate to the War Industries Board, in which he states the steel he seeks to secure will be used only for war essential purposes, and a certificate to the effect that the jobber has signed such a pledge to the War Industries Board must be furnished to mill or sales agency before it can make shipment. On account of increased freight rates warehouse prices have been advanced slightly and are now as follows, f.o.b. Buffalo: Structural shapes, 4.20c.; tank steel plates, 4.45c.; hoops and bands, 4.95c.; No. 10 blue annealed sheets, 5.45c.; cold rolled sheets, 6.45c.; galvanized No. 28, 7.70c.; iron bars, 4.70c.; cold rolled steel, list plus 10 per cent. Canada is fast lining up as a supplier of war materials for the United States Government, and contracts have been awarded for shells of various diameter, fuse parts and adaptors, for which all material is being supplied by the United States Government. This tonnage is all allocated by the War Industries Board and paid for by

the U. S. Government. The John W. Cowper Co. has the contract for the erection of a forge plant for Albert J. Howard, Buffalo, on the Lackawanna Railroad. The Ferguson Steel & Iron Co. will fabricate the steel, about 100 tons. The Cowper company also has the contract for Buffalo plant No. 3 for the Linde Air Products Co., taking a small tonnage of steel. The Corrugated Bar Co., Buffalo, has the contract for about 250 tons of reinforcing bars for construction of a 6-story mill and elevator for the Buffalo Cereal Co.

Old Material.—Acute shortage continues in supplies of heavy melting steel. Large tonnages are being sought by mills in the Youngstown and Pittsburgh districts, and dealers in Buffalo territory are given absolute promises of permits to ship at the differentials in freight. Local demand is large for all lines of scrap, and there is little available for shipment to outside points, every ton of scrap produced in Buffalo district being needed for home consumption. Dealers and consumers here favor the appointment of a Government administrator of scrap distribution in each district to abolish long hauls in distributing to consuming interests when there is urgent consuming demand in the immediate district in which the scrap is produced or gathered. The price schedule is unchanged, as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$29.00
No. 1 low phosphorus, heavy, 0.04 and under	39.00
Low phosphorus, 0.04 and under	36.50
Low phosphorus, not guaranteed	34.00
No. 1 railroad wrought	34.00
No. 1 railroad and machinery cast	34.00
Iron axles	$44.00 to 46.00
Steel axles	44.00 to 46.00
Carwheels	29.00
Railroad malleable	34.00
Machine shop turnings	17.00 to 17.50
Heavy axle turnings	24.00
Clean cast borings	18.00 to 19.00
Iron rails	36.00 to 37.00
Locomotive grate bars	24.50 to 25.00
Stove plate	24.50 to 25.00
Wrought pipe	27.00 to 28.00
No. 1 busheling scrap	29.00 to 30.00
No. 2 busheling scrap	21.00 to 23.00
Bundled sheet stamping scrap	21.00 to 23.00

New York

NEW YORK, July 16.

Pig Iron.—One of the interesting points developed in the filling out of the questionnaire by foundries is the fact that many which are subcontractors for war work have a considerable number of orders of this character at one time and a month later may have comparatively few. This makes the supplying of pig iron a rather difficult problem. But for the most part foundries are fairly well satisfied with the deliveries which they are receiving. Reports from New England indicate that foundries are very busy with increasing percentages of war work. Wages in that section are increasing to such an extent that they probably represent a more serious problem to foundry managers than do all other cost factors. Some fear they will be compelled to close their plants if the 8-hr. day should be enforced. New railroad rates show a change of policy as to freight charges for delivery of pig iron by rail and water. The all-rail rate from Birmingham, Ala., to New York is $7.70 per ton, and the rail and water rate for pig iron delivered at the free lighterage territory is $7.90 per ton for less than 50 tons and $7.80 per ton for 50 tons and over, but the rail and water rate cuts no figure at the present time, as shipments are being made entirely by rail. We quote prices as follows for tidewater delivery on the basis of the new freight rates on Northern and Southern grades:

No. 1 X	$35.40
No. 2 X	34.00
No. 2 plain	33.90
No. 2 X Virginia	37.90
No. 1 Southern (all rail)	42.20
No. 2 Southern (all rail)	40.70

Finished Iron and Steel.—Bids for 10,000 cars wanted by the Expeditionary Forces were opened on July 12 and steel car companies expect that the orders will be awarded this week. There is little new in the general steel situation. Although the steel companies are now permitted to accept and fill some orders without priority certificates, they are not doing so to any marked degree because most of them have a great deal of priority business on hand and are not anxious to place orders on their books when they have no means of knowing when the material can be shipped. Jobbers are placing orders, but are without any advices as to when they will get shipments. The supply of steel is generally tight; that is, little or none is to be had without priority and on some products the priority classification must be fairly high to insure prompt shipment. On sheets the situation is somewhat easier than on plates, shapes, bars and rails, all of which can scarcely be had except by Government sanction. With the larger steel producers the question of ingot tonnage is the all-important one. Some of their departments are suffering for lack of steel because other departments are so heavily loaded with priority orders. A Pennsylvania steel company is, for example, operating its nail and wire department at low ebb because plates, shapes and bars are taking such a large part of its ingot output. A number of structural steel lettings have been made during the past week as follows: The McClintic-Marshall Co., 2000 tons for an ordnance building at Edgewood, Md.; American Bridge Co., 500 tons for derrick towers at the shipyard of the Staten Island Shipbuilding Co., New York, and 6000 tons for two piers at Brooklyn for the Quartermaster's Department, the third pier having been awarded a week ago to the Levering & Garrigues Co.; Lackawanna Bridge Co., 1600 tons for a locomotive repair shop at Cumberland, Md., for the Baltimore & Ohio Railroad; Virginia Bridge & Iron Co., 270 tons for three bridges for the Virginian Railway; Eastern Steel Co., 350 tons for a building for the General Chemical Co., at Baltimore, Md.; Harris Structural Steel Co., 260 tons for a locomotive repair shop at Rutland, Vt., for the Rutland Railroad; an unknown bidder took 1400 tons for bridges for the Chesapeake & Ohio Railway. Post & McCord, New York, were low bidders on 250 tons for a building at the Brooklyn Navy Yard. M. H. McCloskey, Jr., Philadelphia, was low bidder on 1000 tons for an aircraft storage building at the Brooklyn Navy Yard. The Pennsylvania Railroad is in the market for 700 tons of structural steel for repairs to a bridge at Buffalo. and 270 tons for three small bridges. The New York Central is in the market for 700 tons for a bridge at 149th Street, New York. The Vermont Milk Chocolate Co. has withdrawn its projected building from the market. We quote mill shipments as follows: Steel bars, 3.145c.; shapes, 3.245c.; plates, 3.495c., and bar iron, 3.745c., all New York. Out-of-store prices are 1c. higher.

Ferroalloys.—Demand for both ferromanganese and spiegeleisen is less than in many months. Prices are firm and unchanged at $250, delivered, for 70 per cent ferromanganese plus $4 per unit above this standard, and at $75, furnace, for 16 per cent spiegeleisen, plus $3.50 per addition unit. There have been only a few sales of small lots for early delivery of either alloy. One representative of a British producer reports that the British Government has issued a license to his principal for the shipment to this country of 650 tons of standard 80 per cent alloy which can come forward on American contracts if the United States Government permits it. This consignment would be in excess of the 12,000-ton importation recently arranged. E. H. Gary, chairman Committee on Steel and Steel Products of the American Iron and Steel Institute, has issued an official announcement that the new standard of 70 per cent for ferromanganese applies only to contracts involving the domestic alloy. Production in the United States in June was 29,568 gross tons of ferromanganese and 16,398 tons of spiegeleisen, according to THE IRON AGE blast-furnace reports, which include electrolytic alloy. Imports in June, as far as heard from, already amount to 4453 tons. Ferrosilicon, 50 per cent, is strong at $150 on contract and up to at least $160 per ton for prompt delivery.

Cast Iron Pipe.—Manufacturers of cast-iron pipe who have been in the business for many years state that they have never seen such a limited tonnage of pipe being ordered by municipalities. This is due almost entirely to inability of city governments to finance new

projects. Government prices, including the new freight rates, are as follows: $61.75, New York, for 6-in. and heavier and $64.75 for 4-in.; $71.75 for 3-in. with $1 additional for class A and gas pipe.

Old Material.—The announcement of new specifications in regard to several grades of scrap have been received with favor so far as they are known by the trade. Stove plate and grate bars are reclassified and the third grade of low phosphorus must now be guaranteed 0.06 and under in phosphorus and sulphur. Soil pipe is ranked as No. 2 cast. The supply of cars is more satisfactory and shipments are moving forward rather freely. We quote prices of brokers to New York producers and dealers per gross ton, New York, as follows:

Heavy melting steel	$26.20
Rerolling rails	30.80
Relaying rails	$60.00 to 70.00
Iron and steel car axles	43.70
No. 1 railroad wrought	30.80
No. 1 railroad wrought cut to not less than 10 in. or over 24 in.	35.80
Wrought-iron track scrap	28.80
Forge fire	23.50 to 24.00
No. 1 yard wrought long	28.80
Light iron	10.00 to 11.00
Cast borings (clean)	15.30 to 15.80
Machine-shop turnings	15.30 to 15.80
Mixed borings and turnings	15.05 to 15.35
Iron and steel pipe (1 in. minimum diameter), not under 2 ft. long	29.30 to 30.80
Stove plate	22.50 to 23.00
Locomotive grate bars	22.00 to 22.50
Malleable cast (railroad)	30.30 to 30.80
Old carwheels	25.80

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, are:

No. 1 machinery cast	$34.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	34.00
No. 1 heavy cast, not cupola size	29.00
No. 1 cast (radiators, cast boilers, etc.)	$27.00 to 28.00

Philadelphia

PHILADELPHIA, July 16.

Steel companies in this district have not as yet materially changed their method of handling orders as a result of the July 3 statement of the War Industries Board which granted to the producers the right to accept certain orders without priority. Very few of the steel companies are willing to consider orders that are not accompanied by priority certificates. For example, one company has notified some of its customers that an order for plates which does not have an A-3 priority or better is practically worthless. The Priorities Committee of the War Industries Board has been besieged with requests from consumers for special priority ratings to which they are not entitled according to the Government's method of rating industries. This has brought forth a request from the Priorities Committee that steel companies do not advise their customers as to the rating necessary to procure shipments of certain products. Theoretically, there is a surplus of steel over the Government requirements, but actually, no steel is yet available in any quantity for the less essential trade, especially so far as the larger producers are concerned. However, the impression seems to be gaining ground in the steel trade that there will soon be a marked easing up in the situation. The fact that the War Industries Board issued its July 3 statement is believed to be an indication that Government requirements will not take the full output of the steel mills. The favorable rate of production of the past few months has undoubtedly taken care of many Government orders in less time than was expected. Shipments of plates and shapes for shipbuilding seem to be fully up to requirements and a surplus for other than strictly Government needs may soon make itself apparent. Government allocations in the past several weeks have been comparatively light.

Pig Iron.—Several furnaces in this district which are at work on basic pig iron have requested the War Industries Board for permission to change over to foundry iron, but such permission has been denied. The result is that these companies are running behind on shipments to their foundry customers. The Government apparently takes the attitude that, for the present, basic iron is of greater importance than foundry iron, or, in other words, that the consumption of foundry iron can be curtailed with less hindrance to war work. Makers of iron are now trying to find their way out of the maze of Government orders and regulations. Orders to ship iron are frequently received from several different departments in Washington and the result is a certain degree of confusion at the furnaces. Orders allocated by the War Industries Board are given preference, then come the requests for shipments from such Government departments as the Army, Navy and Emergency Fleet Corporation, following which the furnaces take care of their regular customers in the order of importance of the work they are doing. Some in the trade believe that present Government methods of handling the iron situation will result in more and more confusion and they predict that eventually a complete system of priority will be adopted for all iron shipments and sales. There is practically no new selling, but the War Industries Board continues to allocate many tonnages of iron each week. We quote standard grades of iron f.o.b. furnace, except Virginia iron, for which the delivered prices are quoted:

Eastern Pennsylvania No. 1 x	$34.50
Eastern Pennsylvania No. 2 x	33.50
Eastern Pennsylvania No. 2 foundry	33.00
Virginia No. 2 x (including freight)	37.60
Virginia No. 2 foundry (including freight)	37.10
Basic	32.00
Gray forge	32.00
Bessemer	35.20
Standard low phosphorus	53.00
Low phosphorus (copper bearing)	50.00

Ferroalloys.—The market for ferromanganese and spiegeleisen is quiet, though a few inquiries for the latter were received during the past week. Prices remain firm for 70 per cent ferromanganese f.o.b. furnace with freight allowed and $75 for 16 to 18 per cent f.o.b. furnace.

Coke.—We quote 48-hr. furnace coke at $6 and 72-hr. foundry coke at $7, Connellsville.

Billets.—We quote open-hearth rerolling billets at $51.30 Philadelphia.

Plates.—A leading Eastern maker of plates has been allocated 30,000 tons for the Groton Iron Works, Groton, Conn., and the Carolina Shipbuilding Co., Wilmington, N. C. The allotment of plates to the same company for shipment to Hog Island in August is about one-third larger than the shipments in June and July. Plate makers believe that there will be a better supply of plates for the less essential industries within the next two or three months, but there is little tangible evidence of this as yet. It is reported that a few of the smaller plate mills, which do not roll much ship tonnage, are seeking orders, but this could not be confirmed. In some instances, plate makers inform their customers that unless they obtain priority certificates classified as A-3 or better, there is very little chance of getting promises of delivery dates. In fact, one large company has notified its sales managers not to accept any plate orders without priorities. With the placing of additional shipbuilding contracts by this Government with Japanese shipbuilders, it is probable that additional tonnages of plates for shipment to Japan will soon be allocated. We quote plates at 3.25c. Pittsburgh.

Shapes.—The situation as to shapes is practically identical with that of plates so far as priorities are concerned. Jobbers and structural shops are finding it difficult to obtain shipments to keep their stocks up to requirements. We quote plain material at 3c. Pittsburgh.

Iron and Steel Bars.—The situation is practically unchanged. Consumers who cannot obtain priority have little opportunity at present of getting their orders for steel bars filled. We quote soft steel bars at 2.90c. Pittsburgh, and bar iron at 3.73c. Philadelphia.

Sheets.—The sheet mills are not so heavily filled up with priority orders as are the mills rolling plates, shapes and bars. Deliveries of sheets in certain sizes can be obtained from 30 to 60 days and where priority

certificates are presented, mills sometimes can do even better. A bicycle manufacturing plant which was recently closed down for lack of sheets has received a priority on 400 tons, the Priorities Committee of the War Industries Board ruling that bicycles are essential inasmuch as they are largely used by industrial workers. A manufacturer of textile machinery who applied to Washington for a priority on sheets received a printed notice stating that he should have no difficulty in obtaining his requirements without a priority certificate. This declination of his application was referred to a company making sheets and his order was booked. We quote No. 10 blue annealed sheets at 4.25c., No. 28 black sheets at 5c. and No. 28 galvanized sheets at 6.25c. Pittsburgh.

Old Material.—Signs are increasing of the probable shortage of scrap and dealers are finding it more and more difficult to obtain supplies for their customers. Many of the mills are unable to accumulate a surplus as they try to do at this season of the year. The subcommittee on scrap iron and steel is making every effort to bring scrap from its hiding places to the market. It is also discouraging the use of scrap where it can be dispensed with. For example, the committee has been for some time past discouraging the use of scrap by blast furnaces. The scrap committee has investigated many reports of alleged violation of the Government maximum prices. It reports that about 95 per cent of such alleged violations, upon investigation, are proved to be nothing more than statements made by producers of scrap to dealers that other dealers have offered them certain prices which are above the maximum allowable. It is asserted that the reason producers make such statements is to discourage the persistence of dealers to whom they do not care to sell. About 5 per cent of the reports of the alleged violations are found to be correct, but in such cases the committee discovers that the violation is due to ignorance of conditions, this happening especially in the case of producers who have scrap to sell only a few times a year. Prices are without change, being in most cases at the top, plus the commission. We quote for delivery at buyers' yards, eastern Pennsylvania, as follows:

No. 1 heavy melting steel	$29.00
Steel rails, rerolling	34.00
No. 1 low phosphorus heavy 0.04 and under	39.00
Low phosphorus, 0.04 and under	36.50
Low phosphorus, 0.06 and under	$32.00 to 34.00
Old iron rails	39.00
Old carwheels	29.00
No. 1 railroad wrought	34.00
No. 1 yard wrought	33.00
Country yard wrought	29.00
No. 1 forge fire	28.00 to 29.00
Bundled skeleton	28.00 to 29.00
No. 1 busheling	31.00
No. 2 busheling	17.00 to 18.00
Turnings (for blast furnace use)	18.00 to 19.00
Machine shop turnings (for rolling mill use)	18.50 to 19.00
Cast borings (for blast furnace use)	18.00 to 19.00
Cast borings (clean)	19.00
No. 1 cast (for steel plant use)	29.00
No. 1 cast (cupola sizes)	33.00 to 34.00
Grate bars	25.00 to 26.00
Stove plate	25.00 to 26.00
Railroad malleable (for steel plants)	26.00 to 27.00
Railroad malleable (for malleable works)	31.00 to 32.00
Wrought iron and soft steel pipes and tubes (new specifications)	33.00
Ungraded pipe	29.00

Charcoal Iron Tubes.—There is a dearth of business in charcoal iron tubes and one large plant in the East will probably close soon unless the Government takes steps to give it additional business.

Rails.—A request for priority on 400 tons of rails for an industrial plant in the East has been turned down by the Priorities Committee of the War Industries Board, and the steel company which was considering the order was advised that the Government will require the entire rail capacity of the country for the railroads in this country and the requirements of the Army abroad.

Birmingham

BIRMINGHAM, ALA., July 15.

Pig Iron.—Allocation of the basic to be manufactured in Alabama during September, October and November for the English allies has been made and the three companies to make it are understood to have accepted the allocation and await definite orders to begin operations. Two large producers will each make 30,000 tons (one of them perhaps 40,000) and the Alabama Co. will make 15,000. A large company has over 60,000 tons of basic on its yards, which it claims to need itself for war material purposes. This stock has not been drafted. In addition to the basic allocation, small foundry orders, for shipbuilding plants more particularly, continue to be received and are booked. The surplus left for non-essential industries is growing smaller and smaller. There is only 50,000 to 60,000 tons of foundry on Alabama yards, the largest individual accumulation being around 20,000 tons. A three-furnace company declares that at present rate of production it will make during the remainder of the year no more iron than its war order consumers will require. The charcoal iron capacity is more than taken up in the same way. Even with an additional charcoal stack active, orders on hand could scarcely be turned out on time and, owing to scarcity of raw material, it is impossible to increase the charcoal output. Manager Klutz announces that rehabilitation of the furnaces of the Sheffield Iron Corporation at Sheffield is practically completed and that at least one stack should blow in this week. Talladega expects to blow in about the same time. Many foundries have already adapted themselves to war work. The Republic company's coal washer, replacing the one burned several months ago, nears completion and will materially aid in furnace operation.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

No. 2 foundry and soft	$33.00
Basic	32.00

Cast Iron Pipe.—There was a fair sprinkling of Government orders during the week. Several soil pipe shops are approaching 100 per cent on castings for war purposes by rapid adaptation and have received a fair aggregate of orders with the expectation of more to come.

Coal and Coke.—The Tennessee company reported ten-year coal producing records broken on two days of last week and smaller interests agree that there is slight betterment in working hours due to the pressure of public opinion, which appears to have had greater effect than other appeals. Loafers are being weeded out with vigor and are fast disappearing. The Government has fixed $8.25 as the price of Newcastle 72-hr. coke. Most ovens are devoted to 48-hr. coke on account of the pressing demand from furnace interests.

Old Material.—There is a large supply of scrap and it is changing hands in considerable volume. Dealers find it impossible to secure higher prices, because, everything considered, it is to advantage to sell in nearby consuming centers. There is very little dickering as to prices and the market remains stable in that particular. We quote per gross ton f.o.b. Birmingham district yards, prices to consumers as follows:

Old steel axles	$35.00 to $36.00
Old steel rails	28.00 to 28.50
Heavy melting steel	25.00 to 26.00
No. 1 railroad wrought	30.00 to 32.00
No. 1 cast	27.50 to 28.50
Old carwheels	29.00 to 29.50
Tramcar wheels	26.00 to 26.50
Machine shop turnings	15.00 to 16.00
Cast iron borings	15.00 to 16.00
Stove plate	23.00 to 23.50

The Aurora Tool Co., Aurora, Ind., has taken out a $500 insurance policy on each of its employees who has been with the company six months or longer. The company will pay the premiums, the policies to go to the employees.

Cleveland

CLEVELAND, July 16.—(*By Wire.*)

Iron Ore.—No activity has developed in the ore market since the recent advance in prices with the exception of a few sales of small lots of manganiferous ores. Ore is moving down the lakes in very heavy volume and it is predicted that July shipments will exceed the record of any previous month in the history of the trade.

Old range Bessemer, $6.40; old range non-Bessemer, $5.65; Mesaba Bessemer, $6.15; Mesaba non-Bessemer, $5.50.

Coke.—Most foundries have placed contracts for their coke requirements for the last half of this year and the market is inactive. Foundries are getting shipments fairly well on contracts and many are laying in a surplus stock of by-product coke.

Pig Iron.—The demand for pig iron to meet Government requirements has grown heavily from week to week. Since the allocation of iron for war essential work was placed in the hands of the committee on pig iron, iron ore, and lake transportation, that committee during the period from May 1 to July 13 inclusive, has allocated over 243,000 tons of iron. This does not include the 180,000 tons of steel-making iron wanted for England which has not yet been entirely distributed. Allocations amounting to over 36,000 tons were made during the past week and in the same period new inquiries came out and are now awaiting allocation for over 55,000 tons of iron, including all grades except basic. Allocations from May 1 to June 13 inclusive, according to grades in round figures, were as follows: Basic, 87,000; foundry, 81,500; Bessemer, 21,500; low phosphorous, 24,000; malleable, 26,300; Bessemer ferrosilicon, 1100; silvery, 800. Allocations made during the past week included 25,000 tons of foundry iron, 7300 tons of basic, 4000 tons of malleable, 150 tons of Bessemer ferrosilicon. The allocations included 11,000 tons of foundry and malleable iron that will be supplied to a leading Detroit automobile manufacturer, largely for work for the Navy Department. Another Detroit consumer has been allocated 2400 tons of foundry. The basic iron was all assigned to one consumer in the Pittsburgh district. Other allocations included 1500 tons of foundry iron for Hastings, Mich., 1500 tons of foundry for Bridgeport, Conn., 600 tons of Bessemer for McKeesport, Pa., 1000 tons of foundry for Chester, Pa., and 1200 tons of foundry for Richmond, Va. New demands for pig iron for Government work now pending include 30,000 tons of foundry, 6000 tons of malleable, 14,000 tons of Bessemer, 4000 tons of charcoal, 1500 tons of low phosphorous, and 400 tons of silvery iron. After meeting the heavy demands of the Government for pig iron for war essential work, there is practically no iron left in the Cleveland territory for the non-essential industries. Allocations, together with the filling of orders already on their books from their regular trade, to fill the requirements for essential work, are taking the iron as fast as produced and foundries engaged in non-essential industries are unable to secure shipments. Many engaged in such industries are appealing for iron, but without success. A large share of these recently had good-sized stock piles, but these doubtless are nearing depletion. Considerable iron in foundry and malleable grades is being sold for the first half of next year, but the volume of business has hardly been sufficient to reach the scope of an active buying movement. One Cleveland selling agency has booked considerable tonnage for that delivery and another has been making sales but has withdrawn from the market. Other sellers have not yet opened their books for next year. Producers that are selling iron for 1919 are accepting orders only from consumers doing war essential work. One basic iron inquiry for 25,000 tons for the first half of next year has come out, but it is understood that this order has not yet been placed. The pig iron committee is making up its final statement from the replies to the questionnaires sent to furnace companies, all of whom have made their returns with one or two exceptions, and the result of the pig iron survey will probably be made known in a few days. We quote delivered Cleveland, as follows:

Bessemer	$36.60
Basic	33.40
Northern No. 2 foundry	33.40
Southern No. 2 foundry	38.00
Gray forge	32.40
Ohio silvery, 8 per cent silicon	47.90
Standard low phosphorus, Valley furnace	53.00

Finished Iron and Steel.—The last regulations issued by the War Industries Board were received favorably by the trade in that they provide greater flexibility in steel distribution and in some cases are making it somewhat easier for consumers to secure material. However, some mills are so filled up with priority orders that they are refusing to accept class C preference list orders and are advising their customers to procure priority certificates. The new rulings are helpful to sheet consumers, as some sheet mills which have been requiring priority certificates are now accepting preference list orders. The new rulings have also helped the jobbers in respect to the sheet situation, as some mills are accepting jobbers' orders for sheets, limiting these orders to 100-ton lots. Jobbers have been able to keep their stocks of steel bars fairly well replenished, but the new regulations so far have not brought about an easing of this situation in respect to plates and construction material, jobbers being unable to secure these from the mills. Considerable uncertainty has existed in the trade as to the Government regulation of material rolled from discard steel. This has been dispelled by a ruling from Washington that permits must be secured for this steel, but the Government has advised that it will follow a liberal policy in granting these permits. New inquiries are rather light in most lines. An order for rolling field kitchens for the Army has been distributed among a number of manufacturers and will require 6500 tons of sheets and channels. Considerable demand has sprung up from railroads for plates for car-repair work. The demand for bar iron and for hard steel bars is light. Deliveries on the latter can be secured in about 30 days. There is still some demand for steel discard from the automobile industry and an automobile rim manufacturer is inquiring for 1100 tons of steel. Warehouse prices are as follows:

Steel bars, 4.07c.; plates, 4.42c.; structural material, 4.17c.; No. 10 blue annealed sheets, 5.42c.; No. 28 black sheets, 6.42c.; No. 28 galvanized sheets, 7.67c.

Bolts, Nuts, and Rivets.—At a meeting of the bolt, Nut, and Rivet Institute, held in Pittsburgh, July 12, it was decided to make all sales of bolts, nuts, and rivets, f.o.b. Pittsburgh. When prices were fixed by the Government, Pittsburgh was named as the basing point, but bolt manufacturers up to the present time have not taken advantage of this and have followed their former custom. Under this practice, freight was allowed on bolts and nuts shipped to points east of Mississippi and north of the Ohio River. Rivet manufacturers, however, have used Pittsburgh as a basing point, but have made a 25 cent freight allowance on small rivets. The making of Pittsburgh the basing point on bolts and nuts means an advance in price of one to two per cent, according to the classification. The demand for bolts and nuts has become very heavy and makers are getting further behind on deliveries. The demand for rivets in specifications from shipyards, car builders, and other consumers is tremendous. A Cleveland manufacturer has just notified its trade that it is now three to four months behind on deliveries and other rivet manufacturers are said to be in about the same condition. A number of new inquiries for rivets developed during the week aggregating several thousand tons.

Old Material.—The demand for cast scrap has improved because some foundries are using more scrap in their mixture owing to their difficulty in securing pig iron and prices on this grade are slightly firmer. Cast scrap has been somewhat of a drug on the market for some time, but it is predicted that the increased demand will absorb all this supply. Mills guarantee to take all the heavy melting steel scrap offered. One consumer has purchased a round lot of No. 1 new

busheling scrap at $31 plus commission for delivery during the remainder of the year, which is somewhat above the market for yard busheling. The plants of local consumers of busheling are still shut down for repairs. A Midland, Pa., consumer is offering $27 gross for 2000 tons of stove plate. We quote delivery consumer plants in Cleveland and vicinity, as follows:

Per Gross Ton	
Steel rails	$27.00 to $28.00
Steel rails, rerolling	34.00
Steel rails, under 3 ft	34.50
Iron rails	39.00
Iron car axles	46.50
Steel car axles	46.50
Heavy melting steel	29.00
Cast borings	18.00 to 18.25
Iron and steel turnings and drillings	18.00 to 18.25
No. 1 railroad wrought	34.00
Hydraulic compressed sheet scrap	28.00 to 29.00
Cast-iron car wheels, unbroken	29.00
Cast-iron car wheels, broken	34.00
Agricultural malleable	24.00 to 25.00
Railroad malleable	34.00
Steel axle turnings	24.00
Light bundled sheet scrap	24.50 to 25.00
Cast-iron scrap	29.00
Cast-iron scrap, broken to cupola size	32.00 to 32.50
No. 1 busheling	29.00 to 30.00
Per Net Ton	
Railroad grate bars	$22.00 to $22.50
Stove plate	22.00 to 22.50

Cincinnati

CINCINNATI, July 16—(*By Wire.*)

Pig Iron.—Selling agents for one Southern furnace received notice from its principals today that the Southern Railway had notified them that priority certificates were necessary before shipments would be accepted. It is thought that this is a mistake, as no other firms have received any information to that effect and no intimation has been received from Washington changing the tacit arrangement allowing the furnaces to distribute their own shipments of foundry iron. Basic is becoming much scarcer and it is reported that nearby rolling mill stocks have been reduced to a point that may soon develop into a serious situation as far as their output of steel is concerned. A number of foundry melters have asked for iron for first half shipment and a few sales have been made in Ohio to consumers engaged on war work. As a rule, the furnaces do not care to sell that far ahead and the majority of melters see no advantage in contracting for iron for the delivery named. This is in direct contrast to other previous periods, as June and July were always heavy buying months for delivery in the first half of the coming year. Invoice books show that considerable iron is still being shipped on old contracts made before the Government fixed prices September last, and of course this iron is costing melters more than the present schedule of $33 at furnace. Only a few carloads of off iron are being sold to melters on the non-essential list.

Based on freight rates of $3.60 from Birmingham and $1.50 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, No. 2 foundry and No. 2 soft	$36.60
Southern Ohio, No. 2	34.50
Basic, Northern	33.50

Finished Material.—There are indications that the jobbers will be relieved to some extent by shipments from the mills later on. A strong plea was made for stocks urgently needed and which are to be passed along to essential industries only. The decision of the Government to locate a nitrate plant near Cincinnati means that the jobbers will have to furnish a varied lot of finished material for this plant, even though a considerable part of the requirements are purchased directly from the mills. The situation as to barbed wire is unchanged. Jobbers are unable to fill any orders at the present time, and there are no signs that they will be able to get anything from the wire mills at an early date. Stocks of wire nails are also running low and are being carefully distributed.

The following are local jobbers' prices: Steel bars and small structural shapes 4.13c. base; large rounds and squares 2-in. and over, 4.23c. base; plates, 4.48c. base; No. 10 blue annealed sheets, 5.48c.; steel bands, 3/16-in. and lighter, 4.98c. base (using the new band list). Reinforcing concrete bars, 4.25½c., and wire nails, $4.25 per keg base.

Coke.—Although the formal order expected cutting off shipments from the Pocahontas, Wise County and New River fields to points north of the Ohio River has not yet been issued, the movement of fuel to this territory is being discouraged as much as possible. As a consequence, a few foundries in this vicinity are operating on a hand to mouth basis, and practically none has accumulated any stock. Reports from the different producing districts show that the cool weather that has prevailed during the past two weeks has helped materially, and never in the history of the business has there been so little time lost by the workmen on account of the Fourth of July holiday. There is some demand for domestic coke, but little can be had for nearby shipment.

Non-Ferrous Metal Scrap.—Heavy copper has been advanced to 22½c.; light copper is also stronger around 20c.; lead scrap is very firm at 6¼c. per lb. Block tin pipe is unchanged, but there is very little of it to be had in this market.

Old Material.—The dealers are united in reporting a growing scarcity of scrap of practically all grades. In spite of this, prices are not any firmer due to the 25 per cent increase in freight rates, which affect both buying and selling prices here adversely. It is not thought there will be any allocations of scrap as has been rumored from time to time, unless the supply should become very much more limited. The following are dealers' prices, f.o.b. at yards in carload lots, southern Ohio and Cincinnati:

Per Gross Ton	
Bundled sheet scrap	$21.00 to $21.50
Old iron rails	33.50 to 34.00
Relaying rails, 50 lb. and up	44.50 to 45.00
Rerolling steel rails	32.00 to 32.50
Heavy melting steel scrap	27.50 to 28.00
Steel rails for melting	27.50 to 28.00
Old carwheels	28.50 to 29.00
Per Net Ton	
No. 1 railroad wrought	$29.00 to $29.50
Cast borings	14.00 to 14.50
Steel turnings	14.50 to 15.00
Railroad cast	25.00 to 25.50
No. 1 machinery	26.00 to 26.50
Burnt scrap	17.50 to 18.00
Iron axles	40.00 to 40.50
Locomotive tires (smooth inside)	35.50 to 36.00
Pipes and flues	21.00 to 21.50
Malleable cast	24.50 to 25.00
Railroad tank and sheet	18.50 to 19.00

Newspaper Campaign to Collect Scrap

Emory E. Smith, representative of the sub-committee on iron and steel scrap of the American Iron and Steel Institute, for the Pacific Coast, had conducted a newspaper publicity campaign in that section of the country to stimulate a greater production of scrap. The following item was sent by the Associated Press recently to all of its members in Washington, Oregon, California, Utah, Colorado, New Mexico, Arizona, Nevada and western Texas:

The American Iron and Steel Institute, which has undertaken to supply iron and steel products to the Government during the period of the war, has fixed from time to time prices for the purchase and sale of scrap iron and steel, and these prices have been officially confirmed by the President of the United States.

This fixing of price has been for the purpose of regulating and stabilizing the iron and steel industry, and the prices are being rigidly maintained. No advantage can therefore be gained by hoarding or attempting speculation in scrap iron and steel.

All persons, firms or companies in the Pacific Coast district having in their possession scrap cast iron or steel are requested to make it immediately available for war purposes by selling it through the usual commercial channels so that it can reach the foundries and mills.

Any person having knowledge of cases of hoarding or holding for excessive prices are requested to report same at once to this office.

Any person having knowledge of large quantities of scrap iron and steel on abandoned or unused mines, mills, railroads, etc., that can be wrecked and made available are requested to send a detailed report of same without delay to this office. The Government needs your patriotic services and it is hoped these requests will meet with prompt response.

IRON AND INDUSTRIAL STOCKS

Trading by the Public a Minor Factor—Short-lived Selling Wave Has Little Effect.

NEW YORK, July 15.

Trading in stocks the past week was for the most part colorless. While there was a fairly wide range at times in price movements, it was interpreted as a reaction from professional operations. A wave of selling appeared the middle of the week, driving prices down sharply for the time being. The small liquidation resulting from these professional efforts revealed a basic confidence in market values. Quotations in most cases showed a falling off; U. S. Steel, com., 3⅞ points; pref., ¼; Bethlehem Steel, com., 5⅝; class B, 3¾; pref., no change; Colorado Fuel & Iron, com., 1⅝; Crucible Steel, com., 3⅞; Gulf States Steel, com., 1¼; Lackawanna Steel., com., 1¾; Midvale Steel, com., ½; Nova Scotia Steel & Coal, com., ½; Republic Iron & Steel, com., 2½; pref., no change; Sloss-Sheffield Steel & Iron, com., 1½. Superior Steel, com., however, advanced 1 point; United Alloy Steel, com., ¾.

The range of prices on active iron and industrial stocks from Tuesday of last week to Wednesday of this week was as follows:

Allis-Chalmers co.	31½-33⅞	Lackaw. Steel...	81 - 84⅜
Allis-Chalmers pf.	82½-82¾	Lake Supr. Corp.	19 - 21
Am. Can com...	45½-49¼	Lima Loco.	44 - 44¼
Am. Can pf.....	94 - 94⅜	Midvale Steel....	49½-53⅜
Am. Car & Fdry. com.	82⅜-86¾	Nat.-Acme	30½
Am. Loco. com..	63¾-67¼	Nat. Enam. & Stm. com.	51 - 51½
Am. Loco. pf.....	98⅞	N. Y. Air Brake.....	123½
Am. Radiator co.....	235	Nova Scotia Steel.....	56½
Am. Ship com...125	-130	Pittsburgh Stl. pf.....	93
Am. Steel Fdries.	67½-71	Pressed Stl. com.	64 - 67
Bald. Loco. com.	84 - 90½	Ry. Steel Spring com.	57½-61¼
Bald. Loco. pf.....100		Ry. Steel Spring pf.	98½
Beth. Steel com..	81 - 81¾	Republic com....	88½-93¾
Beth Stl. Cl. B..	79¼-83¼	Republic pf.....	99½-100
Carbon Steel com.....112		Sloss com.	62
Central Fdry. co.	35 - 35¼	Sloss pf.	93½
Central Fdry. pf.....	46	Superior Steel ..	42¾-44½
Colo. Fuel	45¼-47	Transue-Williams	39½-39¾
Cruc. Steel com.	64 - 68¼	Un. Alloy Steel..	39 - 39¾
Gen. Electric ...145	-146¾	U. S. Pipe com.....	15¼
Gt. No. Ore. Cert.	31¼-32¼	U. S. Steel com..101½-107⅜	
Gulf States Steel.	84 - 84½	U. S. Steel pf...110¾-111¾	
Int. Har. of N. J. com. 125	-127¼	Va. I. C. & Coke.	71¼ - 72
Int. Har. Corp. co.....	64⅞	Westingh. Elec..	41⅞ - 42⅞
Int. Har. Corp. pf:....100			

Dividends

The Crocker-Wheeler Co., quarterly, 2 per cent on the common and 1¾ per cent on the preferred, payable July 15.

The Dominion Steel Co., Ltd., quarterly, 1½ per cent on the preferred, payable Aug. 1.

Lackawanna Earnings

Although increased charges for taxes made a heavy reduction in the earnings of the Lackawanna Steel Co. in the quarter ended June 30, the report for the period is not regarded as unfavorable, as it shows net profits of $3,312,543 compared with $5,241,459 in the corresponding period of 1917. The net income amounted to $7,922,897, compared with $8,635,838 last year.

The figures for the first half of 1918 show that the profits from operation were $5,059,291 against $8,502,072 in the corresponding period of 1917. This was equivalent to $14.41 a share earned in six months on 350,975 shares of capital stock outstanding, compared with $24.22 a share in the same period last year.

Unfilled orders on its books on June 30 last aggregated 556,207 gross tons, against 913,196 tons on June 30, 1917, and 708,199 tons on March 31 last.

Industrial Finances

A committee of the creditors of the Dauch Mfg. Co., Sandusky, Ohio, has been appointed to act with the directors in managing the affairs of the company. This committee consists of F. W. Sinram, Herbert Farrell, and Frank T. Zollinger, representing respectively the Van Dorn & Dutton Co., Cleveland, the Farrell-Cheek Steel Foundry Co., Sandusky, and the Timken-Detroit Axle Co., Detroit. The company is engaged in the manufacture of farm tractors, but it is stated that it will devote considerable of its capacity to Government work. It is announced that the merchandise claims of the creditors aggregate $300,000 and that the liquid assets are four times that amount.

A petition has been presented in the courts at Pittsburgh asking for a dissolution of the Pittsburgh Reduction Co. The concern for many years was a manufacturer of pure aluminum, but was absorbed some years ago by the Aluminum Co. of America.

RESALES OF PRIORITY STEEL

War Industries Board Will Severely Penalize the Practice

WASHINGTON, July 16.—The War Industries Board authorizes the statement that its attention has been called to the fact that certain manufacturers now on the preference list for steel supply are reselling steel that has been delivered to them as a result of Government priority assistance. In order to prevent abuse of this priority privilege the board has passed a resolution that if any such resales are made hereafter without the approval of J. Leonard Replogle, Director of Steel Supply of the War Industries Board, the manufacturer who is responsible for such resales will be dropped from the preference list and will not receive further priority assistance.

Complaint Against Mayor Johnston

WASHINGTON, July 16—(*By Wire*).—The National War Labor Board has referred to the Attorney General a complaint by members of the International Association of Machinists of Bethlehem, Pa., that Archibald Johnston, mayor of Bethlehem and vice-president of the Bethlehem Steel Co., refuses to permit the Machinists' Union to hold a business meeting in that city. Following is the telegraphic complaint received by the board:

"Serious trouble is threatened in Bethlehem next Wednesday due to refusal on part of Mayor Archibald Johnston, vice-president Bethlehem Steel Co., to issue license to hall owners who have leased hall to members of our organization for business meeting. Our members insist on holding meeting at any cost and bloodshed may result. Please lay this before War Labor Board and Department of Justice at once so that this interference with our peaceful meetings shall be stopped before trouble results.

"(Signed) Dave Williams,
"Business agent, International Association Machinists."

Following is the letter referring the matter to the Attorney General:

The Attorney General,
Washington.

Sir:—

I am enclosing herewith a telegram received in this office this morning. I wish to state for your information that the International Association of Machinists is a legitimate labor organization of high standards. The president is a member of the National War Labor Board. The organization has been formally recognized by the War and Navy departments and the Emergency Fleet Corporation as the medium through which stoppage of work on essential Government contracts has been prevented in the present war emergency. One of the members of the executive board of the association was recently commissioned by Acting Secretary Franklin D. Roosevelt to act impartially in adjusting a serious strike at the Fore River yard in Massachusetts. I might also add that the International Association of Machinists is a branch of the American Federation of Labor.

Recently I conducted a hearing at Bethlehem for the National War Labor Board at which Chief of Police Davies testified. At that time he stated he was the local agent of the Department of Justice. A very significant feature of his testimony was the development of the fact that in his own mind he had made no distinction between Socialists, I. W. W. agitators, anarchists and officers of legitimate trade unions.

Respectfully,
W. JETT LAUCK,
Secretary War Labor Board.

The controversy between the Bethlehem Steel Co. and its employees is now before the War Labor Board.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

An advance in freight rates of 25 per cent from Pittsburgh on finished iron and steel products, including wrought iron and steel pipe, went into effect June 25, 1918. The rates from Pittsburgh, in carloads, to points named, per 100 lb. are as follows: New York, 24.5c.; Philadelphia, 23c.; Boston, 27c.; Buffalo, 17c.; Cleveland, 17c.; Cincinnati, 23c.; Indianapolis, 25c.; Chicago, 27c.; St. Louis, 34c.; Kansas City, 59c.; St. Paul, 49½c.; Denver, 99c.; Omaha, 59c.; minimum carload, 36,000 lb. to four last named points; New Orleans, 38.5c.; Birmingham, 57.5c.; Pacific Coast, $1.25; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is $1.315, minimum carload 40,000 lb.; and $1.25, minimum carload 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 50c. per 100 lb., minimum carload 46,060 lb.; to Omaha, 50c., minimum carload 46,000 lb.; to St. Paul and Minneapolis, 49.5c., minimum carload 46,000 lb.; Denver, 99c., minimum carload 46,000 lb. A 3 per cent transportation tax applies. On iron and steel items not noted above, rates vary somewhat and are given in detail in the regular railroad tariffs.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in. angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, structural sizes, 3c.

Wire Products

Wire nails, $3.50 base per keg; galvanized, 1 in. and longer, including large-head barb roofing nails taking an advance over this price of $2, and shorter than 1 in., $2.50. Bright basic wire, $3.35 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3.25; galvanized wire, $3.95; galvanized barb wire and fence staples, $4.35; painted barb wire, $3.65; polished fence staples, $3.65; cement-coated nails, $3.40 base; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery; terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 47 per cent off list for carload lots, 46 per cent for 1000-rod lots, and 45 per cent off for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets	$4.40 base
Large boiler rivets	$4.50
7/16 in. x 6 in. smaller and shorter rivets	50-10 per cent off list
Machine bolts h.p. nuts, ⅝ in. x 4 in.:	
Smaller and shorter, rolled threads	50-10-5 per cent off list
Cut threads	50-5 per cent off list
Larger and longer sizes	40-10 per cent off list
Machine bolts c.p.c. and t. nuts, ⅝ in. x 4 in.:	
Smaller and shorter	40-10 per cent off list
Larger and longer	35-5 per cent off list
Carriage bolts, ⅝ in. x 5 in.:	
Smaller and shorter, rolled threads	50-5 per cent off list
Cut threads	40-10 per cent off list
Larger and longer sizes	40 per cent off list
Lag bolts	50-10 per cent off list
Plow bolts, Nos. 1, 2, 3	50 per cent off list
Hot pressed nuts, sq., blank	2.50c. per lb. off list
Hot pressed nuts, hex., blank	2.30c. per lb. off list
Hot pressed nuts, sq., tapped	2.30c. per lb. off list
Hot pressed nuts, hex., tapped	2.10c. per lb. off list
C.p.c. and t. sq. and hex. nuts, blank	2.25c. per lb. off list
C.p.c. and t. sq. and hex. nuts, tapped	2.00c. per lb. off list
Semi-finished hex. nuts:	
⅜ in. and larger	60-10-10 per cent off list
9/16 in. and smaller	70-5 per cent off list
Stove bolts	70-10 per cent off list
Stove bolts	2½ per cent extra for bulk
Tire bolts	50-10-5 per cent off list

The above discounts are from present lists now in effect.

All prices carry standard extras.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $57; chain rods, $65; screw, rivet and bolt rods and other rods of that character, $65. Prices on high carbon rods are irregular. They range from $70 to $80, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16 in. x 4½ in. and heavier, per 100 lb., $3.90, in lots of 200 kegs of 200 lb. each, or more; track bolts, $4.90. Boat spikes, $5.25 per 100 lb., f.o.b. Pittsburgh.

Terne Plate

Effective May 21 prices on all sizes of terne plates are as follows: 8-lb. coating, 200 lb., $15 per package; 8-lb. coating, I. C., $15.30; 12-lb. coating, I. C., $17.00; 15-lb. coating, I. C., $18.00; 20-lb. coating, I. C., $19.60; 25-lb coating, I. C., $20.60; 30-lb. coating, I. C., $21.75; 35-lb. coating, I. C., $22.75; 40-lb. coating, I. C., $24.00 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.90c. from mill, and 4.50c. to 5c. from warehouse in small lots for prompt shipment. Refined iron bars, 3.50c. in carload and larger lots, f.o.b. mill.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card, as announced Nov. 5 by the Government on steel pipe, those on iron pipe being the same as quoted for some time:

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛, ¼ and ⅜	44	17½	⅛ and ¼	23	+4
½	48	33½	⅜	24	+3
¾ to 3	51	37½	½	28	10
			¾ to 1½	33	17

Lap Weld

2	44	31½	1¼	18	3
2½ to 6	47	34½	1½	25	11
7 to 12	44	30½	2	26	12
13 and 14	34½	..	2½ to 6	28	15
15	32	..	7 to 12	25	12

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	40	22½	⅛, ¼ and ⅜	22	5
½	45	32½	½	27	14
¾ to 1½	49	36½	¾ to 1½	33	18
2 to 3	50	37½			

Lap Weld, extra strong, plain ends

2	42	30½	1¼	19	4
2½ to 4	45	33½	1½	25	11
4½ to 6	44	32½	2	27	14
7 to 8	40	26½	2½ to 4	29	17
9 to 12	35	21½	4½ to 6	28	16
			7 to 8	20	8
			9 to 12	15	3

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent. Prices for less than carloads are four (4) points lower basing (higher price) than the above discounts on black and 5½ points on galvanized.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers are seven (7) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe are nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh, announced Nov. 13, as agreed upon by manufacturers and the Government:

Lap Welded Steel		*Charcoal Iron*	
3½ to 4½ in.	34	3½ to 4½ in.	12½
2½ to 3¼ in.	24	3 to 3¼ in.	+ 5
2¼ in.	17½	2½ to 2¾ in.	+ 7½
1¾ to 2 in.	13	2 to 2¼ in.	+22½
		1¾ to 1⅞ in.	+35

Standard Commercial Seamless—Cold Drawn or Hot Rolled

	Per Net Ton		Per Net Ton
1 in.	$340	1¾ in.	$220
1¼ in.	280	2 to 2½ in.	190
1⅜ in.	270	2¾ to 3¾ in.	180
1½ in.	220	4 in.	200
		4½ to 5 in.	220

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiation.

Sheets

Makers' price for mill shipments on sheets of United States standard gage in carload and larger lots, are as follows:

Blue Annealed—Bessemer	Cents per lb.
No. 8 and heavier	4.20
Nos. 9 and 10	4.25
Nos. 11 and 12	4.30
Nos. 13 and 14	4.35
Nos. 15 and 16	4.45
Box Annealed, One Pass Cold Rolled—Bessemer	
Nos. 17 to 21	4.80
Nos. 22 and 24	4.85
Nos. 25 and 26	4.90
No. 27	4.95
No. 28	5.00
No. 29	5.10
No. 30	5.20
Galvanized Black Sheet Gage—Bessemer	
Nos. 10 and 11	5.25
Nos. 12 and 14	5.35
Nos. 15 and 16	5.50
Nos. 17 to 21	5.65
Nos. 22 and 24	5.80
Nos. 25 and 26	5.95
No. 27	6.10
No. 28	6.25
No. 29	6.50
No. 30	6.75
Tin-Mill Black Plate—Bessemer	
Nos. 15 and 16	4.80
Nos. 17 to 21	4.85
Nos. 22 to 24	4.90
Nos. 25 and 27	4.95
No. 28	5.00
No. 29	5.05
No. 30	5.05
Nos. 30½ and 31	5.10

Metal Markets

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin,	Lead		Spelter	
July	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
10	26.00	26.00	*94.00	8.05	7.75	8.87½	8.62½
11	26.00	26.00	*94.00	8.05	7.75	8.87½	8.62½
12	26.00	26.00	*94.00	8.05	7.75	8.75	8.50
13	26.00	26.00	....	8.05	7.75	8.75	8.50
15	26.00	26.00	*94.00	8.05	7.75	8.75	8.50
16	26.00	26.00	*94.00	8.05	7.75	8.75	8.50

*Nominal.

NEW YORK, July 17.

Most of the metals are scarce and quotations are strong. Copper is quiet and in no great abundance at the advanced fixed price. Tin is very dull with the price tendency upward. Lead is scarce and strong at agreed-upon levels. Spelter is not active but is firm. Antimony is quiet.

New York

Copper.—The principal question in this market is that of the settlement of contracts entered into between May 31 and July 2, the date of the new 26c. price, as well as some adjustment of the position in which consumers find themselves who have taken business based on the 23.50c. price after a positive statement from the Government that this price would hold until Aug. 15. Producers will probably supply copper to consumers who have bought at 23.50c., but who have not received the metal. As to supplies to the United States and its allies, there is understood to have been no general agreement, some orders having been taken and some not. No official ruling in this has been heard of. The market is generally quiet and devoid of feature and very little business is being done so far as can be learned. The new price for lots of five tons or less is 27.30c. per lb.

Tin.—The market is duller than ever. No business is reported except occasional sales of lots of Banca tin in transit or of Chinese tin. There have been absolutely no transactions in Straits or Lamb and Flag tin, for none is offered. This is due to the license situation in Great Britain where two licenses must now be secured, one to ship the tin and one to sell it, and the one to sell must be obtained first. The indications now are that they are not granting either on the other side. Buyers are not urgent but only await offerings as they appear. Spot tin is nominally higher at 94c. per lb., New York. The freight rate from the Pacific Coast to Eastern points is now $1.25 per 100 lb., as compared with 56.2c. before the 25 per cent advance in freight rates was allowed, an advance of over 100 per cent. There is talk in Washington of a 10 to 20 per cent ad valorem duty on all imports now free of duty. This would affect tin were it put into effect, but the buyer would have to pay it. Arrivals at Atlantic ports thus far in July have been 625 tons with 1925 tons reported as arrived at Pacific ports. The London market is still advancing, spot Straits having been quoted yesterday at £355 10s. against £340 a week ago.

Lead.—The situation is unchanged with producers still attempting concertedly to hold the market at 8.05c., New York, or 7.75c., St. Louis. Unquestionably the metal is scarce, due to the large Government requirements. Most large producers are well sold up. Were they called upon to quote they would have considerable difficulty because of the uncertainty as to freight rates to all points except New York. It is probable that quotations to such points will be on the St. Louis basis plus the freight rate, whatever it is. A meeting in Washington recently to discuss the matter was without definite results, it is understood.

Spelter.—The advance of the past month or two has evidently come to a halt and the market is slightly easier and nominal at 8.50c., St. Louis, or 8.75c., New York, for early delivery and third quarter. For fourth quarter there is no longer any premium but the contrary, no more than 8.50c., St. Louis, being quoted. There is very little demand for any position, sales only of small lots being recorded, some as high as 8.60c., St. Louis, for early delivery.

Antimony.—There has been a fair business done at 13c. per lb., duty paid, New York, for 25-ton lots, which is the quotation. The market is now quiet.

Aluminum.—No. 1 virgin metal, 98 to 99 per cent, and scrap metal are fixed as to price at a maximum of 33c. per lb. for 50-ton lots, 33.10c. for lots of 15 to 50 tons and 33.20c. per lb. for lots of 1 to 15 tons.

Old Metals.—Business is very quiet and the prices quoted are merely nominal. The market has not yet adjusted itself to the new values set by the Government. Dealers' selling prices are reported as follows:

	Cents per lb.
Copper, heavy and crucible	26.00
Copper, heavy and wire	25.00
Copper, light and bottoms	23.00
Brass, heavy	17.75
Brass, light	13.00
Heavy machine composition	26.50
No. 1 yellow rod brass turnings	14.50
No. 1 red brass or composition turnings	23.50
Lead, heavy	7.50
Lead, tea	6.25
Zinc	6.25

Chicago

July 16.—The demand for copper at the new quotation is strong, indicating that price makes little difference with those who need the metal. Tin is strong, with indications of still higher prices, as offerings are extremely limited. Lead is practically unobtainable, producers asserting they are sold up. The demand for spelter is light, but prices remain stiff. Antimony continues dull. We quote copper at 26c. for carloads and 27.30c. for less than carloads; tin, $1 to $1.05; lead, 7.87½c. to 8.12½c.; spelter, 8.75c. to 8.87½c.; antimony, 14c. to 15c. On old metals we quote buying prices, less than carload lots, as follows: Copper wire, crucible shapes, 22c.; copper clips, 21.50c.; copper bottoms, 20c.; red brass, 21c.; yellow brass, 14c.; lead pipe, 6c.; zinc, 5.50c.; pewter, No. 1, 55c.; tinfoil, 65c.; block tin, 70c.

St. Louis

JULY 15.—Non-ferrous metals have been quiet but strong in the past week. Closing quotations to-day were 8.75c. for spelter and 7.75c. for lead in carloads. In less than carloads the quotations were: Lead, 8.50c.; spelter, 10c.; tin, $1.10 to $1.25 nominal; copper, 27.85c.; Asiatic antimony, 15c. In the Joplin dictrict lead ore was stronger, with sales reported as high as $100 per ton, basis 80 per cent, with most of the sales at $97.50 and the week's average for the district at $97 per ton. Zinc blende continued, basis of 60 per cent, in the top grades to sell at $75 per ton, with second grades strong at $52.50 per ton and above. The week's average of all grades for the district was $57.50 per ton. Calamine was quiet but strong, basis 40 per cent, at $30 to $35 per ton, with the week's average for the district at $34 per ton. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 10c.; heavy yellow brass, 14c.; heavy red brass and light copper, 19.50c.; heavy copper and copper wire, 20c.; tinfoil, 60c.; pewter, 30c.; zinc, 5c.; tea lead, 5c.; lead, 5.50c.

Government Publication on Copper

A new publication of the Bureau of Standards, circular No. 73, entitled "Copper," deals primarily with the physical properties of pure and of commercial grades of copper. The best data and values are given for the various physical characteristics and constants, together with a bibliography of the sources from which these values were taken. The effect of impurities upon the properties of copper is discussed, as well as the influence of various factors in its manufacture.

The National Retail Hardware Association, at its annual convention, adopted a resolution indorsing the recommendation of the National Association of Purchasing Agents, that 7½ x 10⅝ in. be the standard size for all catalogs.

Changes Made by Institute Committee

Interpretation as to Ferroalloys—Several Grades of Scrap Included in List of Those Regulated—Prices on Malleable Castings

Judge E. H. Gary, chairman of the Committee on Steel and Steel Products of the American Iron and Steel Institute, made an announcement Tuesday of action taken by the committee on a number of matters, the principal discussions being:

The recommendation of a standard manganese content of 70 per cent for ferromanganese and 16 per cent for spiegeleisen is interpreted not to apply to contracts for foreign ferromanganese or spiegeleisen in effect on May 16, 1918, which should be filled in accordance with the terms of the contract and current customs.

Including burnt iron, burnt grate bars, stove plate, brake shoes, soil pipe and all other inferior grades of cast iron scrap in the list of scrap not to be dealt in at any price in excess of the maximum price of heavy melting steel.

Establishing prices of horseshoes and mule shoes.

Establishing prices of malleable castings.

The statement in full follows:

Judge Gary's Statement

In a statement issued by me under date of May 16, 1918, the Committee on Steel and Steel Products recommended to the trade that a manganese content of 70 per cent for ferromanganese, and 16 per cent for spiegeleisen be adopted as standard, and that deliveries of material of the new recommended standard be accepted as good deliveries on existing contracts, with proper adjustment of tonnage and price.

In order to avoid possible misunderstanding the committee now desires to make it clear that its recommendation that deliveries of material of the new recommended standard be accepted as good deliveries on existing contracts was intended to refer to existing contracts for ferromanganese or spiegel of domestic manufacture only, and that the committee is of opinion that contracts for foreign ferromanganese or spiegeleisen in effect on May 16, 1918, should be filled in accordance with the terms of the contract and current customs of the trade at the time the contracts were entered into.

The committee recommends that importers and dealers in foreign ferromanganese and spiegel and purchasers thereof be governed accordingly.

Scrap

Substitute the following for the corresponding paragraphs in the recommendations of Feb. 21, 1918, as shown on pages 14a, 14b and 14c of the institute pamphlet of January, 1918:

No. 2. Low Phosphorous Steel Scrap.

(c) Steel Knuckles and couplers, rolled steel wheels, railway steel springs, carbon tool steel and similar material in quality and character which will analyze 0.06 and under in phosphorous and sulphur, may be dealt in for use in such plants at a differential of not exceeding $5.00 per gross ton above the base price of heavy melting steel.....MAXIMUM $34.00

No. 3. Steel rails 3 ft. and under, steel splice bars and steel rails, structural steel or similar scrap which has been especially sheared to short lengths for use in cupolas, hand-charging furnaces or for rerolling purposes, may be dealt in at a differential of not exceeding $5.00 above the base price of heavy melting steel .....MAXIMUM $34.00

No. 8. Cast Iron Scrap.

(a) All cast iron scrap, whether broken or unbroken, including cast iron car wheels, may be dealt in at a maximum price of not exceeding that of heavy melting steel, except as noted in Clause B. MAXIMUM $29.00

NOTE.—Burnt iron, burnt grate bars, stove plate, brake shoes, soil pipe and all other inferior grades of cast scrap may not be dealt in at any price in excess of the maximum price of heavy melting steel.

(b) Strictly No. 1 cast iron scrap in cupola shape, in pieces not exceeding 150 lb., when suitable for and to be used only in cupolas or in puddling furnaces, may be dealt in at a differential of not exceeding $5.00 per ton over the maximum price of heavy melting steel.....MAXIMUM $34.00

Wire Nails

Referring to the announcement of Nov. 13, 1917, page 61 of the institute pamphlet of January, 1918, cancel the following:

Base price 20d to 60d common, f.o.b. Pittsburgh, per 100 lb.	$3.50

and in place thereof insert the following:

Base price 20d to 60d common, f.o.b. Pittsburgh, per 100 lb., in carload lots	$3.50
For less than carload lots add per 100 lb.	$0.05

Horse and Mule Shoes

Extra swaged, extra light, light, medium, heavy, long heel, short heel, city pattern and snow shoes, also mule shoes No. 2 and larger, per 100 lb., base, f.o.b. Pittsburgh	$5.75

Subject to the following list of extras (in cents per lb. to be added to the base price per lb.).

Extras for Sizes and Quality

Horse shoes, sizes No. 1 and smaller	0.25c
Mule shoes, No. 1	0.25c
Mule shoes No. 00 and 0	1.50c
Light driving horseshoes, No. 2 and larger	1.00c
Countersunk No. 2 and larger	1.00c
Countersunk No. 1 and smaller	1.25c

Extra for Assorting

All assorted kegs, other than fronts and hinds of the same size	0.15c

Calks

Prices per 100 lb. f.o.b. Pittsburgh:

	200 Ton Lots and Over	Less Than 200 Tons to Carloads Inclusive	Less Than Carloads
Toe calks—blunt, medium, flat and square pattern	$5.50	$5.75	$5.90
Toe calks—sharp pattern	6.00	6.25	6.40
Heel calks—blunt and medium pattern	6.00	6.25	6.40
Heel calks—sharp pattern	6.50	6.75	6.90

Malleable Castings

Freight Car Castings

Price per lb. in cents.

Quantity Ordered	Under 25 Lb.	26 to 100 Lb.	101 to 250 Lb.	251 to 500 Lb.	Over 500 Lb.
Draft lugs	.0890	.0800	.0735	.0715	.0700
J. B. wedges	.0890	.0800	.0735	.0715	.0700
Spring seats	.0890	.0800	.0735	.0715	.0700
Striking plates	.0890	.0800	.0735	.0715	.0700
Truck columns	.0890	.0800	.0735	.0715	.0700
Rail braces	.0890	.0800	.0735	.0715	.0700
Center plates	.0900	.0810	.0740	.0725	.0710
Center plate supports	.0900	.0810	.0740	.0725	.0710
Center sill separators	.0900	.0810	.0740	.0725	.0710
Coupler carriers	.0900	.0810	.0740	.0725	.0710
Push pole pockets	.0900	.0810	.0740	.0725	.0710
Side bearings	.0900	.0810	.0740	.0725	.0710
Back stop castings	.0905	.0815	.0750	.0735	.0720
Bolster center fillers	.0935	.0845	.0775	.0760	.0745

All Other Miscellaneous Freight Car Castings

Price per lb. in cents

	1 to 5 pcs.	6 to 25 pcs.	26 to 100 pcs.	101 to 250 pcs.	251 to 500 pcs.	Over 500
Under 2 lb.	.2625	.2125	.1700	.1250	.1100	.1025
2 to 7 lb.	.2125	.1700	.1225	.1025	.0975	.0925
7 to 15 lb.	.1475	.1150	.1025	.0925	.0875	.0850
15 to 25 lb.	.1225	.1075	.0975	.0875	.0825	.0800
Over 25 lb.	.1150	.1025	.0900	.0850	.0800	.0775

On miscellaneous requisitions above prices are f.o.b. foundry.

On car orders, above prices are: Delivered reasonable destination for lots of 200 cars or over.

Any pattern equipment necessary to be furnished by or at the expense of customer unless tonnage involved will warrant absorption of this expense.

Any castings of intricate design or necessarily of very light section will be subject to special negotiation.

PERSONAL

Ralph G. Farrell, vice-president and general manager Bridgeport Screw Co., Bridgeport, Conn., has been commissioned an ensign in the United States Navy. After his graduation from Sheffield Scientific School, Yale University, in 1914, Mr. Farrell was for some time an employee of the United States Steel Corporation before joining his father, William H. Farrell, in the management of the Bridgeport Screw Co.

J. H. Edmunds has been appointed assistant to the general manager of the Lebanon, Pa., plants, Bethlehem Steel Co. He had been in the employ of the American Iron & Steel Mfg. Co., Lebanon, for several years.

H. W. Griffith, general manager, and J. G. Wood, assistant general manager in charge of manufacturing, of the Remy Electric Co., Detroit, have resigned to become associated with a new organization formed by S. A. Fletcher at Indianapolis known as the Midwest Engine Co. O. F. Conklin, chief engineer since the Remy company started production of starting, lighting and ignition equipment, has been made general manager, and G. V. McMahan, who had been with the company nine years, recently as sales manager of the motor equipment division, succeeds Mr. Wood.

N. R. Feltes has been elected treasurer of the Studebaker Corporation, with headquarters at South Bend, Ind., to succeed C. C. Hanch, former treasurer, who recently resigned to accept the position of chief of the automotive products division of the War Industries Board in Washington.

George A. Armes has become associated with the Moore Shipbuilding Co., Oakland, Cal. He was formerly engineer-in-chief for the Union Iron Works Co., San Francisco.

Harry V. Hunt, formerly general superintendent of the Consolidated Press Co., Hastings, Mich., has been appointed general manager of the O'Neil Iron Works, Buffalo.

Henry Cave, until recently director of technical research with the Davis-Bournonville Co., Jersey City, N. J., has assumed the duties of production manager of the S. K. F. Ball Bearing Co., Hartford, Conn.

Philip M. Guba has been appointed New York sales manager for the Donner Steel Co. He was formerly associated with Jones & Laughlin Steel Co., Pittsburgh.

S. R. Hunter, formerly affiliated with the Fairbanks, Morse & Co., Beloit, Wis., in the capacity of superintendent of the gas-engine department, has resigned to accept the position of the supervisor of production with the American Rolling Mill Co., Middletown, Ohio.

George F. Pettinos has severed his connections with the firm of Pettinos Brothers, Philadelphia, which he established in 1892. He is now engaged in business for himself as distributer of foundry supplies, iron and steel, molding sands and gravel and domestic and foreign graphite.

Zenas W. Carter, commissioner of the Associated Metal Lath Manufacturers, Swetland Building, announces the appointment of Ralph E. DeWitt as assistant commissioner.

E. W. Trimble, formerly sales representative of the Arnold Co., Chicago, in New York, has been appointed sales representative in the Philadelphia district for the C. W. Hunt Co., New York, and the Northern Engineering Works, Detroit. He has opened an office in the Pennsylvania Building, Philadelphia, under the style E. W. Trimble & Co.

James H. Hughes has been appointed manager of the steel and tube department of the Timken Roller Bearing Co., Canton, Ohio. Mr. Hughes was connected with the Carnegie Steel Co., in Cleveland, for many years. He went to Canton Jan. 1, 1913, as resident representative of the Carnegie Steel Co., the Illinois Steel Co. and the Tennessee Coal, Iron & Railroad Co. His official connection with the Timken company began July 1.

Stockholders of the Detroit Iron & Steel Co., Detroit, have elected the following directors: Howard M. Hanna, Jr.; Frank B. Richards, R. S. Grant, M. Andrews, R. E. McMahon, C. M. Osborn, Cleveland; A. A. Schlessinger, Milwaukee; William B. Cady and Arthur C. O'Connor, Detroit. The directors in turn have named the following officers: President, Howard M. Hanna, Jr.; vice-president, Frank B. Richards; secretary, R. S. Grant, Cleveland; assistant secretary and treasurer, W. S. Whitcomb, Detroit. Patrick J. Moran is plant manager.

William M. Bailey, formerly secretary to President A. C. Dinkey of the Midvale Steel & Ordnance Co., has joined the Federal Shipbuilding Co., Kearny, N. J.

Carl H. Snyder, formerly with the Steel Co. of Canada, Ltd., Hamilton, Ont., is now with the Buffalo Bolt Co. as assistant superintendent of its plant at North Tonawanda, N. Y.

J. H. Barringer, assistant manager, foreign department, National Cash Register Co., Dayton, Ohio, at a recent meeting of the board of directors was appointed assistant manager of the company.

Howard K. Moore, office manager Whitaker-Glessner Co., Portsmouth, Ohio, has been appointed assistant to President Andrew Glass.

George W. Moore has been appointed assistant general superintendent Whitaker-Glessner Co., Portsmouth, Ohio, succeeding J. M. Smith, resigned.

W. H. Foster, president of the General Fireproofing Co., Youngstown, Ohio, has been elected chairman of the industrial commission of the Youngstown, Ohio, zone of the War Industries Board. This commission, which has jurisdiction over the Shenango Valley, in which Sharon, Pa., is located, and the Mahoning Valley, in which are Youngstown, Niles and Warren, comprises four counties, namely, Mercer County, Pa., Mahoning, Trumbull and Columbiana counties, Ohio. Mr. Foster, in his opening remarks before 100 manufacturers, stated that the purpose is to mobilize the industries in order that the Government may be more efficiently served in the production of war materials and also the object is to assist non-essential manufacturers to change over to an essential or war basis, thus enabling them to continue to keep their plant in operation and maintain organization throughout the period of the war.

Carl Russell Fish, professor of history, University of Wisconsin, Madison, who has been devoting his summer vacation during the last 10 years or more to the compilation of textbooks on American history, this year is working at a bench as a machinist apprentice in the plant of the Northwestern Ordnance Co. at Madison, which is manufacturing field pieces for the Government.

Prof. Mortimer E. Cooley, University of Michigan, Ann Arbor, Mich., has been nominated for president of the American Society of Mechanical Engineers for 1919. F. R. Low, editor *Power*, New York; Henry B. Sargent, New Haven, Conn., and John A. Stevens, consulting engineer, Lowell, Mass., have been nominated for vice-presidents. Charles L. Newcomb, general manager Deane Works, Worthington Pump & Machinery Corporation, Holyoke, Mass.; F. O. Wells, president Greenfield Tap & Die Corporation, Greenfield, Mass., and Prof. C. R. Richards, University of Illinois, Urbana, Ill., have been nominated for managers. William H. Wiley, John Wiley & Sons, New York, has been nominated for treasurer.

Leroy A. Manchester has assumed his duties as secretary of the Youngstown Sheet & Tube Co., Youngstown, Ohio, and will also continue as attorney for the company, succeeding W. E. Manning as secretary, the latter holding the positions of vice-president and general sales manager.

James L. Wick, Jr., has assumed his duties as

special agent of the Youngstown Sheet & Tube Co., Youngstown, Ohio. He succeeds Roy Welsh, who is now assistant to J. A. Campbell, president, in charge of industrial relations.

E. F. Flad, formerly in charge of the Youngstown, Ohio, slag-crushing plant of the Carnegie Steel Co., has been made chief construction engineer and efficiency expert. He succeeds Fred Hubbard, who now is employed at the Neville Island ordnance plant.

Action of Caustic Liquors on Steel Plate

An account of some investigations on the action of caustic liquors on steel plates is contained in the annual memorandum by the chief engineer of the Manchester (England) Steam Users' Association, C. E. Stromeyer. A brief resume in the London *Times* is as follows:

In one experiment, undertaken to ascertain whether, as suspected, the embrittlement of steel in contact with caustic liquor occurs only when the steel is in tension, a number of rings cut out of steel plate were placed for four months in a caustic evaporator. When taken out and tested those which were in a compressed condition when exposed to the caustic bent double without the least sign of cracking, but two, annealed and unannealed, which were in tension cracked in innumerable places when bent. In another experiment four sets of bars of different varieties of steel were curved in boiler rollers and clamped by screws between two stout iron plates until nearly flattened. Each set was then put in an autoclave with solutions of caustic soda of different strengths, and the autoclaves, hermetically sealed, were placed for four months in the steam space of a Babcock and Wilcox boiler. On removing them from the autoclaves it was found that the spring had been entirely taken out of the samples, and that their ductility had not been impaired in the least. The caustic liquor had, however, produced one marked effect. The band saw would not touch them, and the milling cutters which were then used had to be run at the very slowest speed and even then broke their teeth. Yet the bars originally could be cut quite easily at the highest speed.

The Accident Hazards of Grinding Wheels

The National Safety Council, Continental and Commercial Bank Building, Chicago, has issued a pamphlet giving, in loose-leaf form, the accident hazards connected with grinding wheels and the best practices for their elimination. The subjects of inspection, storage and mounting of wheels are discussed, followed by a statement of the precautions to be observed in the use of flanges on wheels and the speeds at which the machines should be operated and the equipment used in connection with them, such as work rests, wheel dressers, protection hoods, etc. Mention is made of the care to be taken in avoiding injuries to the eyes and the removal of dust from the workroom. General precautions to be observed in connection with the operation of grinding machines are presented and a table of causes of grinding wheel accidents is presented. A number of illustrations showing proper and improper practices are included.

Announcement is made at Washington of the need for technically trained persons for the examining corps of the Patent Office. Men or women are desired who have a scientific education, particularly in higher mathematics, chemistry, physics, and French or German, and who are not subject to the draft for military service. The entrance salary is $1,500. An examination for the position of assistant examiner is announced for Aug. 21 and 22. Details of the examinations and places of holding them may be had upon application to the Civil Service Commission, Washington, D. C. Should the necessity arise, temporary appointments are made of qualified persons.

United States Fuel Administrator Garfield has issued an order fixing the maximum price f.o.b. cars at ovens, per ton of 2000 lb. for 72-hr. selected foundry coke made in beehive ovens at the plant of the Newcastle Coal Co., Ala., at $8.25. It is stipulated that that price shall in no case be charged for any shipments to blast furnaces.

OBITUARY

EDWARD HERMAN WACHS, once active in the iron and machinery industries of Chicago, died June 9 at his home in that city. He was the father of E. H. Wachs, of the Stocker-Rumley-Wachs Co., and of C. L., O. A., W. G. and Theodore Wachs. Though president of the E. H. Wachs Co., maker of steam engines, Mr. Wachs practically retired from active business three years ago. He was born in Germany in 1842 and came to this country in his early youth, settling near Sandusky, Ohio, in 1849. He went to Chicago in 1866 and until 1876 was with the Chicago Chain Works. In 1883 he left that company and engaged in business on his own account in the manufacture of steam engines. Later he incorporated the business, taking in his sons as partners. Before the incorporation, Mr. Wachs was a member of the old Chicago Machinery Manufacturers' Association, which later became the Chicago Metal Trades Association, and which finally merged into the Chicago branch of the National Metal Trades Association. In addition to five sons, he leaves his wife.

SIDNEY W. SHATTUCK, metallurgist for the General Motors Co., Flint, Mich., from 1912 to 1916, dropped dead in Denver, Col., June 24, and his body was taken to Flint for burial. Mr. Shattuck was 32 years old. At the time of his death he was manager of the Shattuck Chemical Co., Denver.

OSCAR R. GRAHAM, treasurer Singer Mfg. Co., Elizabeth, N. J., died at his home in that city July 8, aged 73 years. He had been connected with the Singer company 45 years.

Spanish-English Pamphlets

WASHINGTON, July 16.—An entirely new method of Government trade promotion has been inaugurated by the Department of Commerce, which has issued the first of a series of Spanish-English pamphlets defining with scientific accuracy certain generally accepted American industrial standards for construction materials. The first pamphlet, issued under the auspices of the Bureau of Foreign and Domestic Commerce, is a bilingual text, entitled "Standard Specifications and Tests for Portland Cement," and was prepared by the American Society for Testing Materials, in co-operation with the American Society of Civil Engineers, the Bureau of Standards, the Bureau of Foreign and Domestic Commerce, and the Office of Public Roads.

The pamphlet on Portland cement will be followed by others, the next subject being announced as carbon-steel rails, and the one following that as open-hearth steel girders and high tee rails. The entire series is in press, and will be issued in the near future.

Copies of the pamphlets will be distributed throughout Latin America and Spain, through representatives of the Bureau of Foreign and Domestic Commerce. In this country the distribution will be effected through the Superintendent of Documents, Government Printing Office, Washington, and the various district and co-operative offices of the Bureau of Foreign and Domestic Commerce. "Standard Specifications and Tests for Portland Cement," Industrial Standards No. 1, can be obtained through these agencies at the nominal price of 10 cents.

Will Organize Federal Barge Line

BIRMINGHAM, Ala.—Immediate organization of the Mississippi-Warrior Federal barge line under Director M. J. Sanders, of New Orleans, is expected to follow the McAdoo order favoring the enterprise, Mr. Sanders' appointment and an initial appropriation of $2,500,000. The Mississippi River line will operate between St. Louis and New Orleans and the Warrior line between the Warrior, Ala., coal field and Mobile and New Orleans. The special function of the Warrior end will be to supply 1,000,000 tons of bunker coal annually to Mobile and New Orleans.

Positive Pressure Sand Blast Machine

The W. W. Sly Mfg. Co., Cleveland, has developed a positive pressure sand blast machine that is automatic in operation. The mixing chamber which is located under the lower head of the machine is cast in one piece, having a plate upon which the sand is fed from the tank by passing through an inverted taper feed sleeve. This sleeve is relied upon to prevent any obstruction from entering the mixing chamber that cannot pass through the tip of the hose. After the sand has been discharged by the feed sleeve upon the sand plate, it is wiped forward by an adjustable air port, which enables the flow of sand to be controlled. The air passing this port is divided by a deflector cast integral with the mixing chamber casting, so that the walls, which otherwise would be subjected to the action of the sand, may be protected by a wall of clean air, the sand being nibbled away by that portion of the air that is thrown toward the center. The velocity of the air passing over the plate, it is explained, is sufficient only to wipe the desired amount of sand forward to a point just below the entrance to the hose, where it is picked up by the high velocity air. In this way, it is pointed out, wear in the mixing chamber is eliminated.

The operation of the tank is controlled by a specially designed manifold valve located on the side of the machine in a convenient position for the operator. The valve has only one lever and one progressive movement, forward and reverse, but this is sufficient to fill the tank, admit the air and adjust the sand feed. The feed valve on the top of the tank remains open when the tank is not in use, and the sand or other abrasive is fed from a storage hopper located above the tank falling by gravity through a screen into the machine, until the tank is filled. The lever on the manifold is brought to the first position, which permits the air to enter the tank through a pipe directly underneath and upon which the filling valve rests. The impact of the air upon the bottom of the valve causes it to rise and close the filling opening, but air is permitted to enter the tank through exposed ports while still holding the valve on its seat. The air pressure then builds up in the tank and holds the valve firmly upon the seat, and the next forward movement permits the air to flow into the velocity chamber of the mixer. A continued forward movement opens the air port and sweeps the sand forward into the mixing chamber by the progressive forward movement of the lever. While the valve lever is being moved the volume of blasting air remains constant. If the sand flow becomes impeded for any reason, a further forward movement of the valve lever releases the air in the tank and reverses the flow up through the bottom. This is relied upon to break down any bank or remove the obstruction from the top of the feed sleeve, thus permitting the operator to continue work until the sand in the tank has become exhausted.

Will Build Steel Ships

BIRMINGHAM, Ala.—Harry Leon Brittain and associates, of New York, who have closed a deal in Birmingham for a 52-acre tract of land for a $1,000,000 steel fabricating works, have reorganized the Mobile Shipbuilding Co. and have contracted with the Government to build 12 all-steel ships. Frank McLaughlin, Mobile, is general superintendent.

The Alliance Machine Co., Alliance, Ohio, a few days ago raised a handsome flag at its plant bearing the words, "Auxiliary Plant of the United States Shipping Board," and bearing the emblem of the board. This flag was sent to the company by the United States Shipping Board, and was raised with speechmaking and other ceremonies.

James A. Offield of Chicago, president Bon Air Iron & Coal Co., Nashville, Tenn., and directors of the company, last week went over the properties to select a site for a by-product coke plant, and inspected the construction of two wood alcohol plants being erected on Government property for the use of the Government.

New Publications

"Tests of Large Bridge Columns" is the title of Technological Paper No. 101 of the U. S. Bureau of Standards. The investigation gives a comparative analysis of the experimental data found upon 18 large bridge columns when they were tested in the 10,000,000-lb. testing machine. The action of each column as a whole was studied in a range of loadings taken to destruction of the members. Numerous observations were made to determine the behavior of lattice bars, pin plates, diaphragms, etc. The causes and effects of initial strain from riveting and fabrication were discussed.

Scientific Paper No. 321, entitled "Thermal Expansion of Alpha and of Beta Brass," issued by the United States Bureau of Standards, gives the results of recent investigations of the failure of brass articles, rods, bolts, etc., by cracking. Instances have been observed in which cracking occurred in brass articles which had been quickly cooled from a forging or annealing temperature by quenching or otherwise, and it was considered possible that this may have been due to the development of local stresses in the brass during such cooling. The present study was made with a view to ascertaining the approximate magnitude of the local stresses which might be set up in heterogeneous brasses of the type Muntz metal, and the effect of such stresses upon the mechanical properties of this metal.

The Federal Board of Vocational Education, Washington, D. C., has issued Bulletin No. 15 (Re-education Series No. 3), a 319-page pamphlet dealing with the "Evolution of National Systems of Vocational Re-education for Disabled Soldiers and Sailors." The author is Douglas C. McMurtrie and the volume was prepared at the Red Cross Institute for Crippled and Disabled Men. The first of the two bulletins which precede the present one gave general principles of administration and control in vocational rehabilitation and a sketch of the experience and legislation in Great Britain, France and other Allied countries. The bulletin is an exceedingly interesting narrative of the results accomplished in European countries and the half-tone illustrations are a vivid comment on what are truly marvelous results.

An investigation of twist drills has been completed by the Engineering Experiment Station, University of Illinois and the results published as Bulletin 103. One-inch drills of many well known standard makes and special cast-iron blocks made in the shop laboratories were used. The power required at the drill point for different speeds and rates of feed was noted in all tests, the thrust and torque of the drill were recorded by special dynamometers, and the endurance of drills of different designs was studied. The economical helix angle, point angle, clearance angle, speed and feed were determined, and the effects of pilot holes and rounded corners were shown. The tests were conducted by Bruce W. Benedict, director of the shop laboratories, and W. Penn Lukens, research fellow in the Engineering Experiment Station. Copies of the bulletin may be had gratis by addressing the Engineering Experiment Station, Urbana, Ill.

Fuel economy in the operation of hand-fired power plants, is the title of a publication prepared by a special committee of the research staff of the Engineering Experiment Station, University of Illinois, assisted by an advisory committee consisting of Joseph Harrington, advisory engineer on power plant design and operation, Chicago; Arthur L. Rice, editor *Power Plant Engineering*, Chicago; John C. White, chairman educational committee, National Association of Stationary Engineers, Madison, Wis.; O. P. Hood, chief Mechanical Engineer, Bureau of Mines, Washington, D. M. Myers, advisory engineer on fuel conservation, Fuel Administration, Washington, and C. R. Richards, dean of the college of engineering and director of the Engineering Experiment Station. Requests for copies should be directed to the Engineering Experiment Station, Urbana, Ill., and should specify circular No. 7.

CORRESPONDENCE

The Steel Export Situation

To the Editor: In view of the epochal announcement of June 6, to the effect that the Government has assumed control of all iron and steel products of the country, there would appear at first glance to be little justification for an article on the steel export situation, though it may be as well to state right at the outset that the Government will not interfere with our commerce, either foreign or domestic, if that commerce does not interfere with the vigorous prosecution of the war.

However, in examining the ascertainable facts of the situation, and in drawing the inevitable conclusions therefrom, we shall find that the steel exporting business, far from being at the end of its tether, is still showing signs of life. It will even be found that it is destined to play a much more important part in the future than it has in the past.

The confusion created in the minds of a great number of people as to the steel export situation is, of course, attributable to the uncertainty caused by drastic Government action. It has been asserted, for instance, that the entire production of American steel mills is absorbed by the Government for its war work. If that were true the foreign business in steel would certainly be suspended for the period of the war, with what results can easily be imagined. But are we really justified in expecting such a suspension, which would mean that all the money and labor expended in developing this business would be forever lost?

A glance at the figures of steel production will show that present output exceeds all previous records. Government requirements, of course, are enormous, but it must be remembered that a good deal of the steel called for by the Government has been used, and is still being used, for construction work, which, in the very nature of things, calls for an infinitely larger amount of tonnage at one time than would be required if these plants were already constructed and in operation. It may safely be assumed that when this construction work has been completed—and there is every indication that it will be before many months are over—there should follow a very appreciable decrease in the supply of steel immediately needed, and a very fair amount of steel should be left over for other than strictly Government needs.

What the future may hold in store and what part the steel export trade is yet to play in the economic life of the nation, can best be gaged by what has been done during the last two years. The steel export trade has been to some extent the outcome of the European war, but there can be no question at all as to the very important part it has played in the development of the American steel industry during the last four years.

Before the war a limited number of steel plants participated in foreign trade. A general export trade in iron and steel products was at that time unknown. The element of freight rates, unfamiliarity with foreign trade conditions, and numerous other factors, combined to make the export business in steel a more or less hazardous proposition to the mills, and there were few who cared to go after foreign business in any sort of systematic way.

The sudden strain placed upon the steel industry by the war, altering the whole situation almost over night, brought in its wake the establishment of several steel exporting houses, but only those steel exporters who had the courage to spend money and the energy for the creation and development of foreign markets and those who followed a constructing policy, aiming at permanent business, have survived. It was they who, through untiring vigilance, developed a highly lucrative market in allied and neutral countries for their own benefit, as well as for those of our steel mills who were in a position to connect with an aggressive and well organized export house.

Our entrance into the war made the whole situation infinitely more difficult for the exporter, for it became at once apparent that Government needs of steel would have to be met at all costs. It is not too much to say that our national existence hinged upon the manner in which the steel industry was able to meet war needs. Private interests were necessarily pushed aside to give way to national requirements, and to-day the Government virtually controls the entire steel output of the country.

If, as has been said before, no steel should be available for export, then, as far as American mills are concerned, our foreign trade in steel, which has been built up with so much pains and at such an expenditure of money, on the part of both exporter and manufacturer, is bound to die a premature death.

There is little doubt, however, that the Government authorities in Washington are alive to the importance of maintaining foreign trade to the fullest possible extent. The system of priority orders which has recently been devised for the steel industry should go a long way toward maintaining the trade we have gained. This system provides for steel being supplied to the Allies, and even to neutrals, if it can be shown that the material will in some way, either directly or indirectly, be applied to war needs; and in that case neither the exporter nor the ultimate consumer will have any difficulty in obtaining as well as in getting facilities for shipping the steel so ordered.

Increased railroad freight rates, which have lately gone into effect, are, of course, placing a heavy burden upon the industry, and it is not contended that business is made any easier thereby. Many original estimates have had to be revised, which naturally occasioned some heartburnings among foreign buyers. The necessity of the step, however, is gradually becoming recognized in foreign countries, and on this score, therefore, there should be no great difficulty in continuing our export trade at the present time.

The shipping situation, while not perhaps as favorable as it might be, since we shall undoubtedly require most of the available tonnage for the transportation of our armies abroad and in keeping them supplied with food and material, might likewise be expected to improve as time goes on. There is no doubt that as soon as war requirements have been met a good deal of the tonnage which is now being built will be made available to the export trade.

On the whole, therefore, it would seem that whatever curtailment of steel exports is in effect now is only temporary, and that we shall presently be in a position to export as much, if not more, than we did before this country became actively involved in hostilities. In fact, the burden of the whole argument rests upon the contention that we can maintain the steel export business if it does not interfere with the war.

That it is a very necessary thing to retain the good will of our foreign customers, which has been built up in recent years, and to maintain the markets which have been created at great trouble and expense, is generally conceded. This can only be done by keeping this newly gained trade supplied even in these times. Once the war is over, we shall find ourselves with a steel-making capacity largely in excess of domestic needs. There is no reason in the world why this excess capacity should not be utilized for the benefit of the American steel industry and to supply foreign markets with its overproduction. The money which has been spent by the mills in enlarging their plants and by the steel exporters in building up their overseas trade is an investment which should be preserved. Extensive organizations have been built up, both in this country and abroad in order to supply the needs of our foreign customers, and they should be kept up.

Any excessive restriction of steel exports will not only imperil the huge sums of money which have been invested in the industry so far, but would be most inimical to our national interests. It is a difficult matter to maintain an export business in steel at the best of times, still more so with all the heavy handicaps the trade has to contend with under present abnormal conditions. It has been the mainstay of our for-

eign business during the last few years, and only the closest co-operation between the Government, the mill and the exporter can save for the United States a trade which will be of the most vital importance once the war is over.

VICTOR E. KARMINSKI,
Managing director W. J. Crouch Co., Inc.
New York, July 15, 1918.

Government Will Help Bethlehem Steel Corporation

The Bethlehem Steel Corporation is offering $50,000,000 worth of 7 per cent secured gold notes to investors. The loan has been underwritten by a banking syndicate consisting of the Guaranty Trust Co., the Bankers Trust Co., the Chase Securities Corporation and J. & W. Seligman & Co., New York. The notes will run from one to five years, $7,500,000 maturing each year up to the end of the fourth year and $20,000,000 at the end of the fifth year. The War Finance Corporation has agreed to make a direct advance to the Bethlehem Steel Corporation of $20,000,000 through the purchase of notes of that amount.

The funds derived from the sale of these notes will be used to complete construction work undertaken at the request of the Government. E. G. Grace, president of the corporation, in a statement said:

> The corporation, through this financing, the liquidation of $37,600,000 British Treasury bills maturing February 1, 1919, and appropriations from earnings, will be placed in funds sufficient to complete the construction programme upon which it has been working for the past three years, provide adequate additional working capital and pay off the $50 0[illegible] 5 per cent notes maturing February 15, 1919. This financing when completed will provide comprehensive and well balanced plants and equipment for manufacture of a very extensive and diversified line of commercial steel products.

Plans for Coking High-Volatile Coals

WASHINGTON, July 16.—The Bureau of Standards has been directed by Secretary of Commerce Redfield to make experiments with two methods of coking high-volatile coal, the Koppers method, used by a plant in St. Paul, Minn., and the Roberts process, in operation at Canal Dover, Ohio, either of which would increase the output of by-product coke by permitting the use of coal hitherto considered unsuited for coking. Transportation conditions also would benefit, it is said, through the utilization of coal from almost any field, instead of from the restricted areas where coking coal now is produced. Laboratory tests of the Roberts process virtually are complete and the Bureau of Standards expects to take over operation of the Canal Dover ovens soon with the consent of the owners for further experimentation.

Sloss-Sheffield By-Product Coke Plant

BIRMINGHAM, Ala.—J. W. McQueen, president of the Sloss-Sheffield Steel & Iron Co., officially announces the closing of a contract with the Government under which the Government will take the chemical products of the company's by-product plant. The plant is to consist of 120 Semet-Solvay ovens and is to be in the Birmingham district. With full equipment of ultimate distillation auxiliaries, the plant is estimated to cost $5,000,000. The company will finance it out of its own earnings, but, having Government sanction, will experience no construction delays.

The Heinle Co., metal-rolling engineer, Crafton, Pittsburgh, is furnishing several mills with roll designs disclosing the progressive conformation of a circular hollow billet having walls ½-in. thick. The billet has a single joint for welding whereas the older practice has two joints. After welding, the billet is rolled direct into hollow staybolts or into tubes requiring a heavy wall with a small hole.

The Foundry Trade and War Needs

The Matthew Addy Co., Cincinnati, in its pig-iron market review says:

"The foundry trade is thoroughly at sea regarding present and future business. All foundrymen recognize that the interests of the nation are paramount. There is no question as to that. None of them put their own selfish individual interests first, but nevertheless, they are in business and they naturally wonder whether or not they will be permitted to remain in business. Take, for example, one of the large stove founders in this vicinity. He employs several hundred skilled men in the manufacture of gas stoves and kitchen ranges. His plant cannot easily or economically be adapted to make anything else, as it is highly specialized. Now, he has lost a considerable number of men who have gone into the army. His coke supply has been commandeered for an industry directly related to the war, as gas stoves and kitchen ranges naturally are not on the essential war list; he has a little iron on hand but is finding difficulty in getting more. It would look as if he might be compelled to close his doors until the coming once more of normal times. Of course the whole question simmers down to: How large will be the output of coal, coke and iron? If there is enough of these to supply the vital necessities of the Government then the non-essentials are welcome to the surplus. And as yet no one knows whether or not there will be a surplus. The essentials are all the things the Army and Navy need, ships with their multitudinous machinery, arms and ammunition, means of transportation, agricultural implements so that the soil may be tilled and the crops harvested, etc., and the non-essentials are all the rest. That is all there is to it. The civilian population must be secondary to the Army and Navy. We must make the things that we now have do for the period of war—that is, unless happily there is a surplus so that the business may go on as usual.

"Apparently there will be no surplus. Our iron production runs into figures that are staggering. It seemed a few years ago that we could never use all the iron we made. But in this gigantic war the tonnages of iron and steel products needed for war purposes are also staggering.

"It will be a great calamity should many iron founders be obliged to close. As yet no great harm has been done, but the founders are apprehensively crossing bridges before they reach them."

Standardizing German Steel Ships

The German Reichstag has recently passed a bill authorizing the grant of subsidies to owners of German merchant vessels. A writer in a recent article in *Stahl und Eisen* recommends the standardizing not only of the sizes and types of vessels, especially of cargo boats, but also of the dimensions and outlines of the hull, the method of propulsion, details of construction of the hull, engines and fittings, etc. Due notice is taken of the tendency in this direction abroad, especially in the United States.

Youngstown's New Record

The June payroll of Youngstown, Ohio, industries amounted to $7,054,167, much the largest in any one month in the history of that city. For the first half of this year the total payroll was $37,570,165 and the June payroll was larger than that of May by about $150,000.

The Austin Co., Cleveland, has taken the contract for a building, 60 x 200 ft., for the Atlas Steel Castings Co., Buffalo. This is to be completed in 30 days. The company has also taken an order for a one-story factory building for the Lennox Chemical Co., Cleveland, to be located on Bliss Road, Euclid Village, and for a building, 60 x 200 ft., for the World Starr Knitting Co., Bay City, Mich.

Workers in War Industries

The Wright-Martin Aircraft Corporation, New Brunswick, N. J., is arranging for the employment of women at its plants, to be used for light machine work.

The Traylor Engineering & Mfg. Co., Allentown, Pa., manufacturer of machinery, is now employing girls and women for light machine work at its shops.

The International Motor Co., Allentown, Pa., is constantly adding women to its machine shop force for light work. The women wear bloomers while on duty.

Girls at the new ammunition loading works of the Government at Washington Park, N. J., operated by MacArthur Brothers, New York, are receiving from 34 to 38 cents an hour. The men receive from 45 to 50 cents an hour. About 600 girls are now employed at the works and it is planned to increase this number to about 3000.

Employees at the works of the Lalance & Grosjean Mfg. Co., Harrisburg, Pa., manufacturer of galvanized and enameled ware, have formed a permanent organization for patriotic and parade purposes.

Machinists and boilermakers at the plants of the Stearns-Rogers Co. and Pueblo Foundry, Pueblo, Col., have received a wage advance of 8 cents per hour, or a 65 cents an hour scale. This is 3 cents above the price paid for similar work at Denver.

Factory officials of the General Electric Co., Driver-Harris Co., Hyatt Roller Bearing Co., the Manufacturers' Can Co., Otis Elevator Co., and National Hoisting Engine Co., Harrison, N. J., have arranged to cooperate in developing a weekly public concert at the community grounds, South Fourth Street, for employees' entertainment.

The Pratt & Whitney Co., Hartford, Conn., has announced that it will operate its plant on a basic 8-hr. work day. The 3500 employees of the plant have been working on a basic 9-hr. day, with time and one-quarter for overtime. They will now be paid time and one-half for overtime.

Labor troubles during the past week in the Boston district included strikes of 700 men at the Saco-Lowell Works, Newton, Mass., and of 250 machinists at the Wireless Specialty Co. At the Saco-Lowell Works the men demanded a raise of 15 cents on hourly rates and of about 25 per cent on piece-work rates. They had been offered an advance of three cents an hour.

The long-threatened strike of machinists at the plant of Smith & Wesson, Springfield, Mass., took place July 13, affecting almost the entire force of the plant. The men demand better working conditions and an increase of 25 per cent in pay. The strike was hastened by the discharge of members of the shop committee. One of the chief issues is recognition of the union. Federal and State conciliators are trying to bring about a settlement.

The *Monitor Mercantil*, of Rio de Janeiro, in a recent article on mining operations, points out the important mining operations recently commenced in the State of Bahia, principally in the exploitation of manganese deposits in the Bomfin and Campo Formozo districts. During 1917 various companies were incorporated in that State, and of the 37 applications for the registration of mines 7 were approved. Those applications concerning the various minerals were as follows: Manganese, 53; chrome, 3; graphite, 3; salitre, 2; sulphite of calcium, 1; gold and silver, 1; mica, 1; material for cement, 1; copper and gold, 1.

At an estimated cost of $1,000,000, the Emergency Fleet Corporation is arranging for the construction of a new traction line on the Chester Pike, from Darby to Chester, Pa., for its shipyards. It is proposed to have the line completed early in November.

The entire equipment of the plant of the F. S. Perkins Co., Lowell, Mass., will be sold at public auction on July 25 by J. E. Conant & Co., auctioneers, also of Lowell. The equipment includes many new and used machine tools.

Pittsburgh and Nearby Districts

George S. Oliver, president, and Robert Garland, general manager, of the Pittsburgh Regional War Industries Board, organized the Wheeling District War Industries Board at a meeting of about 100 manufacturers held in Wheeling, W. Va., July 5. They made a full explanation of the Government's plans of organizing all manufacturing industrial centers of West Virginia, western Pennsylvania and eastern Ohio, all to be comprised in the Pittsburgh territory. Valuable data were secured at the meeting regarding the ability of Wheeling manufacturers to handle war orders of the United States and Allied Governments. The Wheeling District includes the counties of Ohio, Brooke, Hancock and Washington in West Virginia, and Belmont and Jefferson in Ohio.

Because of the fast-increasing importance of Pittsburgh as a war industrial center, H. A. Garfield, National Fuel Administrator, has removed that city from under the supervision of the State Fuel Administrator. Announcement of this was made last week by D. W. Kuhn, fuel administrator at Pittsburgh.

A meeting of stockholders of the Pittsburgh Electric & Mfg. Co., Pittsburgh, will be held in that city on July 25, to take action for or against a proposed increase of debt.

The Vulcan Coal Co., Pittsburgh, is in the market for an electric haulage motor, from 4 to 8 tons, 42-in. track gage.

The Pittsburgh Screw & Bolt Co. will erect a concrete warehouse 72 ft. wide and 306 ft. long adjacent to its present plant on the north side, Pittsburgh, to cost about $200,000. The new building will serve mainly as a shipping department and will contain a gymnasium and reading and recreation rooms for employees. It will be so constructed as to permit large extensions when needed. The contract for the building has been awarded to Folwell A. Hiskog Co., Chicago.

Puddlers at the Girard, Ohio, plant of the A. M. Byers Co., who asked union recognition as result of their affiliation with the Amalgamated Association of Iron, Steel and Tin Workers, which demand was refused by the company, have returned to work, pending decision of the issue by the Federal labor conciliator. About 500 men at the plant have joined the union. Some four years ago the puddlers at Girard lost a strike to secure recognition of their union. They were then affiliated with the Sons of Vulcan.

The Youngstown Foundry & Machine Co., Youngstown, Ohio, has bought a 10-acre tract in Girard, Ohio, near the property of the A. M. Byers Co. on which it plans to erect a modern foundry and machine shop. Just when the new plant will be erected is a matter of uncertainty. The acreage was bought at the rate of $5,000 an acre. The Youngstown Foundry & Machine Co. has built three mills for the Carnegie Steel Co. installed or being installed at its McDonald plant, as well as some other heavy equipment within the past year or more, and has large business in prospect. On that account, it is seeking new and larger quarters. W. J. Wallis is president, F. A. Williams vice-president and sales manager, and B. G. Parker secretary and treasurer.

Large Order for Stoves

PITTSBURGH, July 17 (By wire).—The Reznor Stove Co., Mercer, Pa., has received an order from the Government for 10,000 gas stoves for delivery at Nitro, W. Va. They will be installed in homes of workmen, in churches, schools and other buildings now being erected at Nitro, where the Government is building large plants for making war essentials.

The Barker Steel Co., Parkersburg, W. Va., has been incorporated, with a capital of $50,000. The incorporators are G. L. McKim, C. A. Kreps and H. W. Russell, Parkesburg; Frank H. Barker and Christal V. Barker, Fort Thomas, Ky.

EXPORTS TO MEXICO

Agreement Will Permit Freer Movement of Some Products

WASHINGTON, July 16.—A comprehensive agreement has been reached with the Mexican Government under which export licenses will be issued for the shipment, under certain restrictions, of iron and steel articles, agricultural and mining machinery, copper, explosives, coke, and certain food products. Mexico is greatly in need of all these commodities, and the concessions made by the United States Government are in line with pledges recently given by President Wilson in his address to the delegation of Mexican journalists who visited Washington on invitation of the committee on public information.

Licenses for exports of iron and steel articles will be issued freely provided such articles are intended to be used in Mexico for the manufacture of war munitions or food destined to be shipped to the United States. Owing to the great scarcity of iron and steel, this Government is not in position to allow shipments thereof to Mexico for any other purpose.

With reference to agricultural machinery, the policy of the Government will be more liberal. Licenses will be freely issued without regard to whether the machinery is to be used in the production of foodstuffs for exportation to this country, or for consumption in Mexico.

Mining Machinery

An equally liberal policy will be pursued with respect to the exportation of mining machinery, licenses for which will be issued in all cases where the machinery is intended for the production of metals, especially copper and lead. Much machinery heretofore installed at Mexican copper and lead mines has been worn out or destroyed through neglect and the operations of the bandits.

For similar reasons, licenses will be granted for shipments of dynamite, caps and fuses intended for mining purposes. The efforts of the Mexican Government to manufacture these articles at home have not been successful, and there is now a heavy demand which probably cannot be entirely satisfied owing to our own requirements for war purposes.

Regarding licenses for exportations of copper, the War Trade Board states that they will be granted "to as great an extent as the conservation measures of the United States will permit." It is understood that the demand for copper is limited to manufactured forms, and, as our own requirements are very heavy, it is doubtful whether any great quantity will be licensed in the near future. Practically the same situation exists as to zinc.

Ferromanganese

While it has been suggested to Mexico that small quantities of ferromanganese may occasionally be licensed for shipment to that country, warning is given that these exports will never be permitted to run into any considerable tonnage owing to the pronounced shortage of this commodity in this country. Heretofore, all applications for exports of ferromanganese to Latin America have been denied, and the assurance that even small quantities will occasionally be permitted to be exported to Mexico is regarded as an important concession.

After conferences with officials of the Fuel Administration, the War Trade Board has decided to permit reasonable quantities of coke to be shipped to Mexico, but all applications for licenses will be referred to the Fuel Administrator, in order that he may specify the district from which the coke shall be taken. It is understood that this fuel will be exported solely for metallurgical purposes, and that the resultant product will either be shipped to the United States or employed to release other material for shipment to this country.

In promulgating this list of important concessions the War Trade Board makes the following significant statement:

> The above list of articles is not meant to be exclusive. The Government of the United States will be glad to consider carefuly and in the most friendly spirit any requests which the Mexican Government may make for the inclusion of other articles in this list. The United States has been compelled to conserve certain commodities indispensably required for its own use and for the use of the governments associated with it in the war which in normal times would be permitted to be freely exported from the United States to Mexico; but as a result of the efforts of the United States Government to stimulate production, the list of such conserved articles will gradually contract and condition of trade and intercourse between the two countries will, it is hoped, soon become normalized. In taking this friendly position toward Mexico, the United States Government has no doubt that the Mexican Government will continue to allow commodities not imperatively needed in Mexico to be exported to the United States, and will not permit the commodities and food received from the United States nor similar commodities and food to be exported to other countries.

The officials of the War Trade Board and of the State Department have emphasized to the Mexican authorities the necessity for observing the injunction that the articles embraced in this concession shall not be re-exported to other countries. This injunction applies especially to all commodities used in the production of war materials.

Larger Steel Supply in Great Britain

The discontinuance of exports to Russia, together with a large domestic output, has resulted in a considerable increase in available supplies of steel in the Birmingham district, according to U. S. Consul E. Haldeman Dennison, Birmingham, Eng. The enormous demand for war material is being adequately met, with something left over to meet the requirements of the civil trade. There is a more regular delivery of steel of all descriptions, and some consumers who have been without supplies for some months are now receiving allotments. Local founders are sending heavy rolling machinery to all parts of the country. Large extensions of steel rolling mill plant are still in progress in many of the iron and steel districts. These will soon still further increase the output. The position of sheet makers has improved, but the trade in galvanized corrugated qualities is very small outside of government requirements. Black painted sheets for shelters for the American army are being called for in very large amounts. It is stated that the plate mills are now well ahead of their contracts and that the serious congestion in the boiler plate trade is being relieved.

Supervision of Coke Breeze

UNIONTOWN, PA., July 16—Application by Wiley L. Byers, district representative in the Connellsville Region of the Fuel Administration, of the revised coke prices brings under closer supervision the production of coke breeze, now being shipped in quantity from this region. Screened coke, unless properly cleaned, will be classed as breeze and as such will be sold at $3 to $4.50 per net ton, depending upon quality. Shipments of screened coke passed by Government inspectors will command $5 per ton, which is $1 per ton less than the price for blast furnace coke. Ash dumps which have accumulated for years at the various operations have been found to possess a tangible value with the introduction of coke breeze into the trade, but the Fuel Administration had had some difficulty in bringing the quality up to required standards.

In connection with the new advisory committee for steel and allied interests at Los Angeles, Cal., appointed to co-operate with the Government, A. C. Denman, Jr., of the Southern California Iron & Steel Co., will represent the steel mills on the committee; H. S. Hitchcock, of the Baker Iron Works, will represent the foundries, and Philip Senegran the scrap-iron dealers.

Machinery Markets and News of the Works

BIG LIST FOR AIRPLANES

Wright-Martin Corporation Buys Heavily

Demand for Machine Tools Is Active in All Lines of Government Work

The Wright-Martin Aircraft Corporation summoned machine-tool dealers and factory representatives to its office this week and placed orders for approximately 600 machine tools for its plants at Long Island City, N. Y., and New Brunswick, N. J. Both of these factories are at work on Hispano-Suiza airplane motors. The Long Island City plant, recently owned by the General Vehicle Co., will be brought up to a capacity of 40 motors a day. The New Brunswick plant has been turning out about 500 motors a month, and this will be increased materially. The Bosch Magneto Co.'s factory at Plainfield, N. J., has been sold to the Wright-Martin corporation by the Alien Property Custodian, and will be utilized in airplane motor work.

Demand for machine tools is active in all branches of Government work, including ordnance, airplanes, railroads, shipbuilding and tractors. Expansion of machine-tool plants is being planned in a number of instances. One company making large tools, such as are needed for ordnance and shipbuilding, will greatly increase the size of its works.

Companies in New England making Browning guns have obtained bids on additional machine-tool equipment, but have taken no action, as they are awaiting Government decision as to their plans for increasing their output.

Two fair-sized export inquiries for South American countries, both covering equipment for shell making, reached the New York trade last week. There is a fair inquiry for small and medium-sized tools in the New York district, and a good demand for large tools. Among purchasers the past week were the John Thompson Press Co., New York, and the New Departure Mfg. Co., Bristol, Conn. James M. Motley, 71 Beaver Street, New York, is inquiring for about 50 miscellaneous tools.

Shipbuilding and railroad companies are active in the Philadelphia market. The Pennsylvania Railroad is buying and will need considerably more equipment for its Altoona and Marietta, Pa., shops. The Chesapeake & Ohio Railroad has bought about 15 large tools. The Taylor-Wharton Iron & Steel Co. will buy additional tools for its Tioga gun plant, Philadelphia.

In the Middle West there is a steady volume of orders. In Chicago, the New York Central Railroad is placing good-sized orders, and the makers of tractors and gas engines have figured as large buyers, among them being the Falls Motor Corporation, Sheboygan Falls, Wis.; the J. I. Case Threshing Machine Co., Racine, Wis.; and the Interstate Motor Co., Muncie, Ind. Construction of the new shell plant of the Symington-Chicago Corporation, owned by the Symington interests of Rochester, N. Y., has been begun. The Studebaker Corporation, South Bend, Ind., which is building a new shell plant to cost $300,000, has been assured of all the shell business it can handle for two years, according to report in the Chicago machinery trade. Its present contracts are said to total $20,000,000. Another report places the total as high as $50,000,000. The Wisconsin Gun Co., Milwaukee, Wis., will double the capacity of its ordnance works, which is turning out 3-in. field pieces, and has placed large orders for tools.

Detroit reports a constant influx of war orders, and there is a steady demand for machine tools in that city. The Olds Motor Works, Lansing, Mich., will spend more than $1,000,000 in the construction of a new automobile plant, about half of which will go for equipment.

A Cincinnati machine-tool builder recently received an order for 150 single-purpose lathes from a shell maker. This builder points to the inability of foundries to make prompt deliveries of castings as a reason for delayed shipments of tools.

Cleveland makers of automatic screw machines report inquiries from the East for several hundred machines.

The Government will require a large number of locomotive cranes for shipment abroad. Inquiry for traveling cranes has fallen off in Eastern markets in the past week, but a number of large inquiries are still pending. The plans of the Bethlehem Shipbuilding Corporation for a new shipyard at Baltimore are now reported to have been officially approved, and the equipment to be bought will approximate in quantity that purchased for the new Liberty shipyard of the same company at Alameda, Cal.

New York

NEW YORK, July 16.

There is more or less activity in every branch of Government work, though general inquiry for machine tools of the smaller and medium sizes is not exceptionally large. The demands of new gun plants and shipyards will, of course, more than take up the capacity of plants equipped for building large tools for some time to come. At least one builder of large tools will considerably enlarge its works to meet the demands of the Government.

The Wright-Martin Aircraft Corporation, Long Island City, N. Y., last week received Government approval of its plans for enlargement and summoned machine-tool dealers and factory representatives to its offices Monday morning to place orders for about 600 tools for work on Hispano-Suiza airplane motors. The capacity of the Long Island plant, formerly the works of the General Vehicle Co., will be brought up to 40 motors a day. The Wright-Martin corporation has purchased the plant of the Bosch Magneto Co., Plainfield, N. J., from the Alien Property Custodian, who had taken it over from its German owners. The factory will be used to make parts for Hispano-Suiza motors. The Willys-Morrow plant of the Willys-Overland Co., Elmira, N. Y., has received a contract for Liberty airplane motors. The Standard Aircraft Corporation, Elizabeth, N. J., will greatly increase the size of its factory, and new equipment will probably be required.

Expansion of the work on Browning guns is under way. The Marlin-Rockwell Corporation, New Haven, Conn., is expecting an additional contract for the heavy type Browning guns. Other New England companies have received quotations on lists of tools for increasing their output, but no action has been taken, as they are awaiting Government approval of their plans.

There has been a scarcity of export inquiries in recent months, except for our Allies, because of the difficulty of getting export permits, but two South American countries are now in the market for tools for making munitions, and their agents express hopefulness of obtaining priority certificates. One inquiry is issued by the Holsam Co., Inc., 18 Broadway, New York, which wants engine lathes, planers, light sensitive drills and other tools for work on 75 and 155-mm. shells. Heat-treating and foundry equipment is also desired. This is for some South American country which is not named in the inquiry. The Consolidated Rolling Mills & Foundries Co., 25 Broad Street, New York, has obtained bids on a list of tools for the Chilean Government, also for shell work.

The John Thompson Press Co., New York, bought a small list of tools last week for munitions work. The New Departure Mfg. Co., Bristol, Conn., also bought a small lot of equipment last week.

James M. Motley, 71 Beaver Street, New York, has issued a list of about 50 miscellaneous tools for a client in the Philadelphia district.

Inquiries for cranes have fallen off sharply during the last week. The Driver-Harris Co., Harrison, N. J., wants a 5-ton and a 10-ton crane of 30-ft. span. The Midvale Steel & Ordnance Co., Philadelphia, has revised its list of cranes for the new gun plant to be built at Nicetown, Pa., the list now numbering 26 overhead and two special cranes. The New York Shipbuilding Corporation, Camden, N. J., has divided about 20 cranes among the following companies: The Morgan Engineering Co., Alliance, Ohio; the Alliance Machine Co., Alliance, Ohio; the Pawling & Harnischfeger Co., Milwaukee, Wis., and the Bedford Foundry & Machine Co., Bedford, Ind. The Tacony Ordnance Corporation, Tacony, Pa., has ordered a 5-ton crane from the Chesapeake Iron Works, Baltimore, Md.

C. W. Leavitt & Co., 30 Church Street, New York, are seeking quotations on two 65-in. x 35-ft. lathes, with individual motor drive, second-hand if in first-class condition.

Among the companies affected by the commandeering by the Government of Bush Terminal buildings at South Brooklyn for the Army and Navy departments are the Automatic Machine Products Co.; W. H. Cotton, manufacturer of tools; the Williams Oven Mfg. Co., manufacturer of bakers' ovens; the Englander Spring Bed Co., manufacturer of iron and brass beds; the Acme Die Casting Corporation; the American Laundry Machinery Co., the Carpenter-Tew Gear Co., and the John Wood Mfg. Co., manufacturer of boilers, tanks, etc. These companies will find other factories, and, it is said, for the most part will relocate in Brooklyn. Removal must be made by Dec. 1.

The Republic Mercantile Corporation, New York, has been incorporated with an active capital of $125,000 by H. E. Comings, G. L. Lewis and M. H. Avram, 44 Whitehall Street, to manufacture tools, etc.

The National Dry Dock & Repair Co., New York, has been incorporated with a capital of $500,000. The proposed works will be located on Staten Island. E. P. Morse, Jr., East Fourth Street, Brooklyn; C. Palmer and J. A. McManus, 27 William Street, New York, are the incorporators.

Bids are being received by the National Lead Co., 111 Broadway, New York, for the proposed five-story building, 50 x 210 ft., to be erected at its Atlantic Works, Marshall Street, Brooklyn, at an estimated cost of $175,000.

The Generator Valve Co., 47 Dinsmore Place, Brooklyn, has increased its capital from $10,000 to $25,000.

A refrigerating plant to cover an entire block will be constructed by Armour & Co., Chicago, on property bounded by Fourteenth and Fifteenth streets and Tenth and Eleventh avenues, New York.

To provide for increased operations, the National Casket Co., Long Island City, has leased property comprising about 60,000 sq. ft. in the two-story concrete factory on Webster Avenue, between Seventh and Eighth avenues, Long Island City. The company recently relinquished its plant on Jackson Avenue, Long Island City, to the Government, and, closely following, leased the four-story works of the Studebaker Corporation on Anable Avenue, near Meadow Street, for its plant. The property just acquired will be used as an extension to the latter works.

The Hamilton & Chambers Co., 29 Broadway, New York, steel merchant, has increased its capital from $100,000 to $150,000.

The Doehler Die Casting Co., Ninth and Huntington streets, Brooklyn, has increased its capital from $500,000 to $1,000,000. It has awarded contract to the Turner Construction Co., 244 Madison Avenue, New York, for the erection of a seven-story reinforced-concrete building, 90 x 105 ft., to cost $175,000.

Two shipbuilding berths with auxiliary shop and erecting buildings will be constructed by the Bureau of Yards and Docks, Navy Department, Washington, at the Brooklyn Navy Yard, for the construction of the 40,000-ton battleships recently authorized by Congress.

The Wright-Martin Aircraft Co., New Brunswick, N. J., is now producing on an average of 500 Hispano-Suiza airplane motors, and expects to increase this production to about 750 per month by fall. The motors are being constructed in 100, 200 and 300-hp. sizes. The local plant is now giving employment to about 5000 persons, and it is said that this number will later be increased to about 8000.

The Crescent Truck Co., 347 First Avenue, Elizabeth, N. J., has acquired all rights to and interest in the Crescent electric industrial truck from the S. L. Moore & Sons Corporation, Elizabethport, and will manufacture it in connection with its line of allied equipment.

The Matchless Metal Polish Co., 151 Varick Street, New York, has acquired the former works of the Rare Metal Products Co., Glen Ridge, N. J., as a manufacturing plant for the production of buffing compounds, metal polishes, etc.

James McKenzie has had plans prepared for an addition to his two-story machine shop at 531-33 West Nineteenth Street, New York, to cost about $15,000.

The International Marine Welding Co. of New York, New York, has been incorporated by M. Murphy, C. R. Stewart and R. T. Anderson, Greenwood Lake, N. Y., with a capital of $100,000.

The Stanwood Tube & Can Co., New York, has been incorporated with a capital of $30,000 by S. Abramson, H. W. Frey and L. Schnitzer, 182 St. Nicholas Avenue, to manufacture cans, tubes, etc.

The Terry Shipbuilding Corporation, 70 East Forty-fifth Street, New York, affiliated with the Terry & Tench Co., building contractor, is reported considering the erection of a shipbuilding plant at Hunterspoint Avenue and Orton Street, Long Island City.

The C. K. Mfg. Corporation, New York, has been incorporated with a capital of $50,000 to manufacture galvanized metal products. C. L. Kay, I. and W. K. Bach, 560 West 148th Street, are the incorporators.

The Herbert Brush Mfg. Co., Greenkill Avenue, Kingston, N. Y., has increased its capital from $25,000 to $350,000 and is planning the erection of a two-story building, 50 x 100 ft., to cost $30,000.

The Standard Key Machine Mfg. Co., Poughkeepsie, N. Y., has increased its capital to $35,000.

The H-2-O Still Co., New York, has been incorporated with a capital of $100,000 by G. H. Draper, F. D. Berry and H. A. Rice, 8 West Fortieth Street, to manufacture distilling equipment.

The Slocum, Avram & Slocum Laboratories, Inc., 531 West Twenty-first Street, New York, has purchased a plant in Newark, N. J., to be used for Government work, and will immediately build a large addition to it. A. F. Hinrichsen is vice-president.

The Union Smelting & Refining Co., Newark, is planning the early operation of its new works at St. Charles Street and Avenue L, now nearing completion. Work has been commenced in the main manufacturing unit, a structure 112 x 450 ft. Twelve furnaces have been installed, eight for smelting and four for refining. The mixing room covers about 5500 sq. ft., and is equipped with seven kettles. The hydraulic press room provides an area of about 5000 sq. ft., and the solder department, 5500 sq. ft. The works will specialize in the production of white metal products, including babbitt metal, solder, etc., and when entirely completed, with full equipment, will represent an investment of about $500,000.

The Bureau of Yards and Docks, Washington, has awarded contract to the John K. Turton Corporation, 101 Park Avenue, New York, for extensions to the Naval Air Station at Rockaway, Long Island, to cost $185,000. Among the structures will be an aeroplane motor testing shop, a one-story laboratory and compressor works, 30 x 60 ft., and a one-story dirigible airship repair shop, 50 x 100 ft.

The Standard Appliance Co. of America, New York, has been incorporated with a capital of $95,000 by J. L. Volz, E. Goodman and N. Shaw, 32 Cooper Square, to manufacture telephone equipment.

Following the use of its works at Hunters Point, Long Island City, N. Y., for the manufacture of airplane engines for the Government, the General Vehicle Co. has discontinued entirely the manufacture of motor trucks. The entire plant is now employed on the production of aircraft motors, and it is understood that other arrangements will be made for handling parts and repair work for its motor trucks.

The John A. Crowley Co., 120 Liberty Street, New York, steel merchant, has increased its capital from $100,000 to $500,000.

The Meier & Oelhaf Co., 179 Christopher Street, New

York, operating a coppersmithing works, has increased its capital from $10,000 to $100,000.

The Transatlantic Shipyards Corporation, 95 Liberty Street, New York, has acquired the shipbuilding works at Tottenville, S. I., formerly operated by J. S. Ellis & Son.

Alexander McDonald, West Brighton, Staten Island, N. Y., operating a boat-building works on Richmond Terrace, has increased his capital from $10,000 to $100,000.

Emanuel Spiro, machinist, has leased property at 168 Centre Street, New York, for a new works.

The Allied Steel & Supply Co., 58 Warren Street, New York, has increased its capital from $10,000 to $50,000.

The Ogdensburg Shipbuilding Corporation, New York, has been incorporated with a capital of $50,000 by C. R. Allison, H. L. Andrews and A. M. Skivens, 111 Broadway, New York.

The Continental Tramway Co., Elizabeth, N. J., has been incorporated with a capital of $100,000 by Edward J. Grassman, Albert F. and Augustus J. Bender to manufacture tramways.

The Crucible Steel Co. of America, South Fourth Street, Harrison, N. J., has acquired property, 70 x 238 ft., on Cape May Street. It is understood that it will be used for an extension.

The Metal & Thermit Corporation, Cornelson Avenue, Jersey City, N. J., has filed plans for a one-story addition on Johnston Avenue, to cost about $15,000.

A new one-story machine shop to cost $10,500 will be erected by Henry Byrne, Jersey City, at 73-79 Academy Street.

The Everlasting Valve Co., Westside Avenue, Jersey City, has filed plans for a brick extension to its plant to cost about $20,000.

The Air Reduction Co., 177 Pacific Avenue, Jersey City, has awarded a contract to James Mitchell & Co., 76 Montgomery Street, for an addition to cost $30,000.

The L. S. Brach Supply Co., 129 Sussex Avenue, Newark, has been incorporated with a capital of $200,000 by Leon S. and Alexander G. Brach to manufacture railroad signals.

A one-story car works, 160 x 500 ft., to cost $45,000, will be constructed by the Public Service Railway Co., Terminal Building, Newark, at Bloomfield Avenue and Lake Street.

The Star Electric Motor Co., 245 New Jersey Railroad Avenue, Newark, has arranged for the occupancy of a new one-story brick plant, 110 x 130 ft., and 90 x 130 ft., to be erected at New Jersey Railroad Avenue and Miller Street at a cost of $31,000. It is understood that the company will operate as the Star Fan & Motor Works.

The Union Tool Co., Newark, has been incorporated with a capital of $20,000 by Carl Bachman, G. Schmidt and Santo P. Mayacotta.

The Copely Mfg. Co., 42 Walnut Street, Newark, has increased its capital from $24,000 to $90,000. Plans have been filed for the construction of a one-story shop addition, 21 x 125 ft., for the manufacture of machinists' tools.

Louis Sacks, Inc., Newark, operating a gray-iron foundry on Hamburg Place, has been incorporated with a capital of $50,000 by Louis and David L. Sacks to manufacture steel and other castings.

Gould & Eberhardt, Newark, manufacturers of shapers, etc., have leased their former works on New Jersey Railroad Avenue for warehouse purposes, and will combine operations at their new plant on Chancellor Avenue, Irvington. The company will retain the foundry at the New Jersey Railroad Avenue plant, and will operate it for the production of light castings, until greater foundry facilities are provided at the Irvington works. The castings will be conveyed by trucks to the latter plant for finishing.

Anton Louy & Co., 511 West Twenty-first Street, New York, manufacturers of marine plumbing supplies, etc., have filed plans for a five-story factory, 50 x 90 ft., at 517 West Twenty-first Street, to cost $50,000.

The Newburgh Shipyards, Inc., Newburgh, N. Y., has increased its capital from $3,000,0000 to $6,000,000.

The Automatic Refrigerating Co., 50 East Forty-second Street, New York, with works at Hartford, Conn., has increased its capital from $500,000 to $750,000.

The Turck Printing Press Co., New York, has been incorporated with a capital of $99,000 to manufacture printing presses, etc. T. L. Ernst, 253 West Seventy-second Street, New York; H. C. Higbie, Springfield Gardens, Long Island, N. Y., and H. B. Holland, 108 Prospect Place, Brooklyn, are the incorporators.

The South Atlantic Shipbuilding & Dry Dock Co., New York, has been incorporated with a capital of $1,000,000 by F. Frank and E. W. J. Kaysel, New York.

The Public Service Electric Co., Newark, N. J., is planning the rebuilding of its power station at Keasbey, N. J., recently destroyed by fire.

Buffalo

BUFFALO, July 15.

The Buffalo General Electric Co. and the Niagara, Lockport & Ontario Power Co., Buffalo, have commenced the enlargement of their steam operated power plants to afford an additional output of about 62,000 hp. Extensions will also be made in the hydroelectric power plants of the Hydraulic Power Co. and the Niagara Falls Power Co., Niagara Falls, to provide an additional 160,000 hp. This increase in power will be used by local industrial plants working for the Government. These extensions have been approved by the War Department.

The Sill Stove Works, 524 Oak Street, Rochester, N. Y., has increased its capital from $200,000 to $800,000.

A new three-story wood-working plant, 45 x 66 ft., will be erected on Gifford Avenue, Syracuse, N. Y., by O. L. Wood. Plans are being prepared by N. H. LaVaute, First National Bank Building.

A two-story factory, 60 x 100 ft., to cost $40,000, will be constructed by the Auburn Button Co., Canoga Street, Auburn, N. Y.

The United States Light & Heating Co., Highland Avenue, Niagara Falls, N. Y., manufacturer of train lighting equipment, etc., has awarded a contract to Lauer & Mack, 1834 Pierce Avenue, for the construction of an addition.

Plans have been completed by the Semet-Solvay Co., Syracuse, for the rebuilding of its plant on Milton Ave., which will embrace three trinitrotoluol plants, one nitric acid plant, boiler house, laboratory and office building. E. L. Pierce is vice-president.

The Kennedy Valve Co., Elmira, N. Y., is having plans prepared for a factory to be erected this summer.

New England

BOSTON, July 15.

The Worcester Stamped Metal Co., Worcester, Mass., has awarded to the E. J. Cross Co., a contract for an addition, 96 x 108 ft.

The Rutland Railroad, Rutland, Vt., has awarded to Westinghouse Church Kerr & Co., New York, a contract to build a machine shop, 105 x 263 ft., one story, and a repair shop, 125 x 175 ft.

The Hartford Special Machinery Co., Hartford, Conn., has increased its capital stock from $100,000 to $250,000.

The Crompton & Knowles Loom Works, Worcester, Mass.; is to build a one-story addition, 20 x 60 ft.

The Connecticut Brass Co., Waterbury, Conn., has awarded to the T. J. Pardy Construction Co., Bridgeport, Conn., a contract for an addition, 72 x 72 ft., one story.

The Billings & Spencer Co., Hartford, Conn., has awarded a contract to the J. H. Grozier Co. for an addition to cost $14,000.

The Barnett Drop Forging Co., Easthampton, Mass., has awarded to the Berlin Construction Co., Berlin, Conn., a contract for an addition, 30 x 60 ft., one story.

The Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., will build two additions, 40 x 80 ft., two stories, and 35 x 80 ft., one story.

The New London Ship & Engine Co., New London, Conn., has awarded to the J. H. Grozier Co., Hartford, Conn., a contract for a power plant, 50 x 90 ft., one story.

The United States Government has awarded to the E. F. Carlson Co. contracts for two additions at the Springfield Arsenal, Springfield, Mass.; a die hardening shop, 20 x 28 and 20 x 22 ft., one and two stories, and a gun stock storage building, 50 x 250 ft., one story.

The Boston & Penobscot Shipbuilding Co., Boston and Bangor, Me., has been incorporated with authorized capital stock of $75,000. The incorporators are G. H. Lucey, Swampscott, Mass., Edna M. McKay, Boston, and W. L. Burhoe, Reading.

Government appropriations for the New England district have been granted as follows: For a machine shop and foundry at the Boston Navy Yard, $900,000; machine shop addition, $200,000, foundry addition, $130,000, and improvements to power plant, $150,000, all at Portsmouth Navy Yard; enlargement of submarine base at New London, Conn., including erection and equipment of repair shops, $750,000, and for boiler and engine room enlargements at the Springfield Arsenal, Springfield, Mass., $225,000.

The Vermont Evaporator Co. has decided to locate in Rutland, Vt., in a building on Strongs Avenue. All power used by the company will be furnished by the Rutland Railway, Light & Power Co.

Philadelphia

PHILADELPHIA, July 15.

Shipbuilding companies are the principal purchasers of machine tools and allied equipment in this market. The Bethlehem Shipbuilding Corporation, Bethlehem, Pa., heads the list. It is now placing orders for machine tools for its new shipyard at Alameda, Cal. The Sun Shipbuilding Co., Chester, Pa., has bought quite heavily for its new boiler and machine shops. The New York Shipbuilding Corporation, Camden, N. J., has placed additional orders in the past week for tools for additions to its shipyard. It is reported that the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., will build at Richmond Va., a new boiler shop only, instead of a boiler shop and reciprocating engine plant, as was at first contemplated. This project, however, is awaiting the approval of the United States Shipping Board.

The Pennsylvania Railroad Co. is buying a few small lots of tools for its repair shops, but will shortly buy on a large scale for its locomotive shops at Marietta and Altoona, Pa. The Juniata shop at Altoona will be considerably enlarged. Bids have already been received on a list of machine tools for the Marietta shops. The Chesapeake & Ohio Railway has bought about 15 large tools.

Expansion of the Tioga gun plant of the Taylor-Wharton Iron & Steel Co., Philadelphia, is planned by the Navy Department. The Tioga plant is forging and rough machining 5-in. naval guns. A number of large tools is being inquired for.

The George Oldham & Son Co., 4320 Tackawanna Street, Philadelphia, manufacturer of machine tools, pneumatic tools, etc., has filed plans for a two-story addition to its machine shop to cost $9,000.

The Midvale Steel & Ordnance Co., Widener Building, Philadelphia, is taking bids for the construction of three new brick, steel and concrete additions to its works at Nicetown. The structures will consist of a one-story shop, 114 x 180 ft., to be used for rough machine work; a one-story machine shop, 183 x 560 ft., for finishing work, and a heat-treatment building, one-story, 75 x 580 ft.

The Niles-Bement-Pond Co., Twenty-first and Callowhill streets, Philadelphia, has awarded contract to the Austin Co., Bulletin Building, for alterations and extensions in its foundry at Ruffner and Donath streets, to cost $7,000. It will also build a one-story foundry addition at this location, 65 x 115 ft., to cost $20,000.

The Pennsylvania Railroad Co., Philadelphia, is having plans prepared for the erection of a new engine house at Pitcairn, Pa., to include a machine shop, etc. It will also build an extension to its engine house at Shire Oaks, plans now being prepared. Contract has been awarded to the Wilson & English Construction Co., 50 Church Street, New York, for an engine house, etc., to include a machine shop, etc., at Gardenville Junction, near Buffalo, N. Y., to cost $75,000. Plans have been prepared for an addition to the engine house at Orangeville, near Baltimore, Md. A. C. Shand is chief engineer.

The Pennsylvania Forge Co., Wakeling and Stiles streets, Philadelphia, has filed plans for a one-story steel and concrete foundry building, 60 x 100 ft., and 42 x 60 ft., at Jenks and Bath streets, to cost $20,000.

The Richard De Cou Co., Twelfth and Noble streets, Philadelphia, manufacturer of structural shapes, it is stated, has acquired 23 acres of land on Adams Avenue, near the Oxford Branch of the Connecting Railroad, to be used for extensions.

The Southwark Bronze Co., Finance Building, Philadelphia, has filed plans for a 100-ft. one story brick addition to its machine shop at the corner of Water and Mifflin streets.

The National Galvanizing Co., 1021 North Front Street, Philadelphia, has filed plans for a one-story brick and steel shop addition, 35 x 85 ft.

The Government is having plans prepared for the construction of buildings at the Frankford Arsenal, Philadelphia, to cost about $1,000,000. Contract has been awarded William R. Dougherty, 1608 Sansom Street, for a one-story brick and concrete shop, 52 x 123 ft., with wing 30 x 30 ft., to cost $200,000.

The Port of Philadelphia Dry Dock Co., Camden, N. J., has been incorporated with a capital of $100,000 to operate a shipbuilding works. Louis Starr and Joseph J. Summerill, Jr., Woodberry, and John B. R. Nixon, Bridgeton, are the incorporators.

The Delaware Ship & Repair Co., Beach and Erie streets, Camden, N. J., has taken out a permit for the construction of a forge shop at its works.

The Milton Mfg. Co., Milton, Pa., manufacturer of nuts, etc., has awarded a contract to Sauers & Moore, Broadway, Pa., for a forge shop, which, it is understood, will replace, in part, its shop recently destroyed by fire.

Baltimore

BALTIMORE, July 15.

The Baltimore & Ohio Railroad Co., Baltimore, will erect a one-story crane runway, 26 x 284 ft., at Pratt and Appleton streets, Baltimore, at a cost of $10,000.

The Boyden Co-ordinating Car Corporation, 110 East Lexington Street, Baltimore, has been incorporated with $100,000 capital stock to manufacture railroad cars, street railway cars, etc. The incorporators are Theodore G. Lurman, Robert Ramsay and George A. Boyden.

The John T. Lewis & Brothers Co., 1015 East Fayette Street, Baltimore, plans the construction of a plant at Columbia Avenue and the Baltimore & Ohio Railroad for the manufacture of shrapnel balls.

The American Can Co., Union Trust Building, Baltimore, will build a four-story addition, 105 x 175 ft., to its local plant at Hudson and Boston streets.

The Crisfield Shipbuilding Co., Crisfield, Md., has acquired the shipbuilding plants of J. B. Nelson and Tawes & Gibson. Two of the buildings on the property will be equipped as machine shops. The company has contracts from the Government for five tugs. The officers are: James B. Tawes, president; B. F. Gibson, vice-president; J. Millard Tawes, secretary and treasurer, and L. J. Nelson, general manager.

The American Power & Railway Co., Charlotte, N. C., has been incorporated with $100,000 capital stock by H. M. Victor, C. B. Bryant and D. D. Traywick.

The Bartlett Hayward Co., Scott and McHenry streets, Baltimore, has awarded contract to Morrow Brothers, Fidelity Building, for a one-story forge shop, 245 x 300 ft., at Putnam Street and Columbus Avenue, to cost $250,000.

In connection with the new extensions to be made at the plant of the Bethlehem Shipbuilding Corporation (the Bethlehem Steel Corporation), Sparrows Point, Md., a floating drydock to handle 20,000-ton vessels will be constructed. It will be built in 12 sections, each 44 x 110 ft. The work of assembling is now under way. It is understood that the new works will be equipped for the production of steel vessels, with facilities for 15,000-ton types and upward.

The Emergency Fleet Corporation, Washington, is planning the construction of a shipbuilding works at Norfolk, Va., to cost about $3,000,000, with five drydocks to provide for 12,000-ton merchant vessels.

In connection with proposed yard improvements at its works at Roanoke, Va., the Norfolk & Western Railway Co. is planning to increase the capacity of its engine house.

The Athens Foundry & Machine Works, Athens, Ga., is arranging to increase its capital from $30,000 to $100,000.

The Edge Coal Co., St. Paul, Va., recently organized, is planning the installation of an engine, pumping equipment, etc. J. H. Lynch is general manager.

The proposed new nitrates plant to be erected by the Government near Indian Head, Md., is estimated to cost in excess of $5,000,000. A site of about 1200 acres is being considered for the works which will be particularly designed to furnish nitrates for the powder plant in this vicinity.

The Brunswick Marine Construction Corporation, Brunswick, Ga., is reported planning the enlargement of its works, with equipment for the construction of steel vessels.

Cincinnati

CINCINNATI, July 15.

Makers of heavy punching and shearing machines and metal forming machinery have sufficient business on hand to keep them operating several months ahead. Most of this urgent demand is from shipbuilding concerns, including Government yards.

A machine-tool maker in this vicinity recently received a rush order for 150 single purpose lathes for shell work, but delivery may be delayed on account of slowness of the foundries in turning out the necessary castings.

Pattern makers in six local plants have made demands on their employers for an increase in wages from 70c to 75c per hr., a 44-hr. week and double pay for overtime. The demands were refused and a walkout occurred, but a sufficient number of men have been secured to keep all the plants operating at reduced capacity. It is believed that most of them will be working regularly within the next few days.

The demand for portable electric drilling machines is unprecedented. Quite a number are being shipped to Italy and the domestic business is far ahead of any previous record.

The Alvery-Ferguson Co., Cincinnati, maker of conveying equipment, will soon let contract for an addition to its plant in Oakley that will have 5000 sq. ft. of floor space. It will

...ed for light machine work where women will be employed almost exclusively.

The Central Frog & Switch Co., Station O, Cincinnati, has commissioned Bausmith & Draine, architects, to draw up plans for its new factory buildings to be erected on Wasson Road. George Ashton is president.

...nt of the General Briquetting Co., Winton ...ti, will probably be in operation within the ... The company will briquette cast borings. ...is president and E. R. Week, secretary.

... Co., Norwood, Ohio, will make a second ad...it, 48 x 245 ft., one story.

... Machine Tool Co., Hamilton, Ohio, has ac...ty formerly owned by the Ceramic Machine ...e plant from the Ceramic company.

... Agthoven Sons Co., Cincinnati, cooperage ...ill rebuild its plant on Front Street, re...by fire.

... Son, Inc., Hamilton, Ohio, will build a ...uburb for the assembling of farm tractors. ... not yet been incorporated and full details ... William B. Mayo, B. R. Millikin and ...hler, all of Hamilton, will be directors in ...

...el Co., Dayton, Ohio, has been organized ... tractor wheel. G. Harries Gorman, for...ent of the Davis Sewing Machine Co., is ...

...Ohio Central Railroad Co. has let contract ...truction Co., Cleveland, for a round house, ...l other buildings to be constructed at ...

...ity of ...mbus, Ohio, will purchase hoisting equip...nt for use in ...e new municipal coal yard.

...Plymo... ...ltamped Metal Co., Plymouth, Ohio, has ...n inc...or... ...with $25,000 capital stock by D. S. French ...others.

...The Mosler ...k Co., Covington, Ky., is equipping a ...t at Third and Scott streets.

Cleveland

CLEVELAND, July 15.

...automatic and screw machines has in...reased ma... ...nd two or three inquiries from the East ...are noted ...l hundred automatic machines.

...The G... ...received bids July 15 for locomotive ...cranes fo... ...rance for the American Expeditionary ...Forces and ...nch Government. While the number ...is to be pu... ...ot specified, requirements are large. It ...is stated ... Government contemplates taking the ...entire ... plants from the time of completion of ...existi... ...next June, but as the capacity is ap...proxi... ...es per month, it is not believed that ...the ... be required.

...uses report a good scattered demand ...ohio and Detroit for lathes, heavy duty ...l milling machines in large sizes for ... gun carriage and aerial bomb work. The New York Central Railroad has distributed practically all the machinery covered by its recent large list among a number of manufacturers.

A local machine-tool builder the past week booked 15 screw machines for the J. I. Case Co., Racine, Wis.; 9, Western Machine Products Co., Cleveland; 10, Eclipse Machine Co., Syracuse, N. Y.; 9, New York Airbrake Co., Watertown, N. Y.; 5, National Acme Co., Cleveland; 2, Mitchell Motors Co., Racine, Wis.; 2, Jackson-Church-Wilcox Co., Saginaw, Mich.; 2, Essington, Pa., plant of the Westinghouse Electric & Mfg. Co., and several single orders, and 9 turret lathes for the Falls Motor Co., Chicago. The Lakewood Engineering Co. has purchased a boring mill and 2 lathes. The Trumbull Steel Co., Warren, Ohio, is buying several machines.

Several Cleveland foundries are operating 85 per cent on direct or indirect Government work. The Government has deferred placing large orders for gray-iron hand grenades for which it recently sent out an inquiry.

Some automobile manufacturers are crowding foundries for shipments of motor and other castings, endeavoring to secure a supply to protect themselves against possible action by the Government in further restricting the use of pig iron in this industry.

The National-Acme Co., Cleveland, will shortly begin the erection of an extension to one of its buildings, which will be used for assembling the larger sizes of machines. The addition will be one story, 191 x 120 ft., with crane runways in its two bays. The company is moving its products department to its new plant on East 131st Street, where a main building, covering over six acres of floor space, has been erected. Operations have commenced in the new plant and the removal of the machines will be gradual, so that production will not be interferred with. When the removal is completed the old plant will be used entirely for the manufacture of machinery. The general offices will be moved to a building adjoining the new plant.

The Johnston & Jennings Co., Cleveland will enlarge its foundry by an extension, 80 x 100 ft. Ernest McGeorge, engineer, Leader-News Building, prepared the plans.

A new one-story factory, 60 x 118 ft., will be erected at 5330 Hamilton Avenue, Cleveland, by Christian Birnbaum, president Standard Pattern Works. It will be occupied by the Ohio Reamer Co.

The Buckeye Brass & Foundry Co., Cleveland, will build a new brass foundry, 45 x 68 ft., at Hawthorn Avenue and Ashland Road.

The Steel Products Co., Cleveland, has taken out a building permit for an addition, 93 x 100 ft.

The Chandler Motor Car Co., Cleveland, will enlarge its plant by the erection of two temporary buildings, 44 x 220 ft., and 30 x 240 ft., respectively, to be used for the manufacture of tractors. The company has a large Government contract for 10-ton tractors and has erected one new building for this work.

The John Harsch Bronze & Foundry Co., Cleveland, has been incorporated with a capital stock of $50,000, by A. V. Cannon and others.

Emil A. Stotter has sold his interest in the Lake Erie Smelting & Refining Co., Cleveland, to C. B. Bohn and Max Stotter of the Peninsula Smelting Co., Detroit. E. A. Stotter recently organized the Cleveland Smelting & Refining Co., which is building a new plant.

The Detroit Reamer & Tool Co., Detroit, Mich., has been incorporated with capital stock of $100,000 by E. E. Lemarz, and B. B. Selby of the Cleveland Power Transmission Co., to operate the plant formerly owned by the Welsmore Mfg. Co., 202 East Congress Street, Detroit. The officers are E. E. Lemarz, president; C. H. Beardsley, vice-president; E. H. Krueger, secretary; B. B. Selby, treasurer. It will manufacture high-speed reamers, milling cutters, and special tools.

Arthur B. Babbitt, Boston Mass., became general manager of the Kent Machine Co., Kent, Ohio, July 1, and Alton B. Pitts, Worcester, Mass., has been made superintendent. The company has been authorized to increase its capital stock to $100,000, with a view of extending its business.

The Reeves Brothers Co., Alliance, Ohio, will build an addition, 125 x 250 ft. Larger capacity was required as the company is fabricating steel for the construction of ships for the Emergency Fleet Corporation.

The Universal Machine Co., Bowling Green, Ohio, has taken over the Urschel Drop Forge Co., Bowling Green. The former company has increased its capital stock to $1,000,000 common and $250,000 preferred. The Urschel Co. was organized two years ago to insure a supply of drop forgings for the Universal Company. The drop forge plant will be enlarged and new machinery added.

The Carroll Foundry & Machine Co., Bucyrus, Ohio, has been placed in charge of Charles F. Michael, president Ohio Locomotive & Crane Co., Bucyrus, who will act as general manager until the termination of the war. O. L. Bradley has been appointed superintendent. It is reported from Bucyrus that the changes in the organization resulted from action taken by the War Industries Board. The company is largely engaged on Government work.

The Toledo Screw Products Co., Toledo, Ohio, will erect a machine shop, 32 x 150 ft. adjoining its plant. It is stated that it recently received an order for 1,000,000 1-lb. shells for the Navy Department.

The Bock Bearing Co., Toledo, is contemplating extensions which will about double its capacity. This plant is one of the units of the Standard Parts Co., Cleveland.

The Willys-Overland Co., Toledo, is contemplating a number of extensions, which will include a 300-ft. one-story building to be fitted up as a machine shop for making 8-in. shells, and a boiler room.

The Eclipse Stove Co., Mansfield, Ohio, has commenced the erection of a building, 83 x 370 ft. It is making army stoves and kitchens for the Government, and is understood to have a large amount of work on its books.

Machinery is being installed in the new plant of the American Machinery Co., Mansfield, Ohio, which has been built for Government work. It will be placed in operation the latter part of this month.

The American Road Machinery Co. is considering the erection of a new building, 100 x 500 ft., in Delphos, Ohio, for munition work.

The Mathews Engineering Co., Sandusky, Ohio, which has

made several recent additions to its factory, will add 13,500 ft. of floor space within the next 40 days. This will give room for the employment of 500 persons.

Milwaukee

MILWAUKEE, July 15.

Although large-lot orders for machine-tools received by local makers are rather few and far between, the incessant stream of single tool and small lot requirements from all parts of the United States is keeping plants booked up solid and no improvement in delivery has been possible. Milling machine manufacturers continue to encounter a particularly urgent demand for the heavier types, although the lighter machines are also moving well. A considerable list of tools and other equipment has just been placed by the Wisconsin Gun Co., Milwaukee, for an addition to double the capacity of its ordnance shop. Manufacturers of munitions continue to make shop extensions and are inquiring for tools constantly.

The demand for cranes is unquestionably the broadest in experience here. All crane builders are working to capacity and several are enlarging their shops; but this provides only temporary relief from the high pressure of requirements.

The Wisconsin Gun Co., Milwaukee, will double the capacity of its ordnance works at Thirty-eighth Avenue and Orchard Street, West Milwaukee, which will make it possible to increase the output within sixty days from three to six guns per day. The main shop, 130 x 275 ft., will be duplicated in size. The general contract for the work has been awarded to the Worden-Allen Co., Milwaukee, which erected the original building in fifty-one days. The Wisconsin Gun Co. was organized about a year ago and is building 75-mm. field pieces ready for mounting on the carriage. The working force will be increased to 450 as soon as the new shop is completed. It is stated that practically all of the machine-tool equipment required has been placed. Henry J. Wiegand is general manager.

The Leathem & Smith Co., Sturgeon Bay, Wis., shipbuilder and repairer, has awarded contracts for a one-story machine-shop addition, 30 x 100 ft., equipment for which is now being purchased. Several new berths are being laid and the plant generally enlarged.

The Bayley Mfg. Co., 732 Greenbush Street, Milwaukee, manufacturer of fans, blowers and ventilating systems, is contemplating the construction of a gray-iron foundry, 60 x 150 ft., costing about $25,000 complete. The company has been buying all its castings, but the increasing difficulty of obtaining them may make it advisable to provide its own supply. E. M. Bassler is secretary.

The Bissell Lumber Co., Marshfield, Wis., which recently increased its capital stock to $300,000, has purchased the interests of the Stolle Lumber & Veneer Co., Tripoli, Wis., and will enlarge the sawmill by adding a horizontal re-saw unit, increasing the annual capacity from 15,000,000 ft. to 20,000,000 ft. The veneer mill will also be improved. E. D. Stone is manager.

The Bendlich Canning Machinery Co., Milwaukee, has increased its capital stock from $10,000 to $200,000.

George F. Rohn, 524-526 Jackson Street, Milwaukee, manufacturer of electrical equipment and general electrical contractor, has incorporated under the style of the George F. Rohn Electric Co., with a capital stock of $60,000. The incorporators are George F. Rohn, H. J. Jung and Alfred W. Rohn.

The Modern Steel Treating Co., 220 Becher Street, Milwaukee, has increased its capital stock from $5,000 to $25,000.

The board of education, Marshfield, Wis., has authorized a bond issue of $60,000 for the construction of a vocational training institute and junior high school. An architect will be selected at once and work will begin about Aug. 15.

The Kenosha Die & Stamping Works, Kenosha, Wis., is contemplating the erection of a new plant costing about $12,000 with equipment.

A building permit has been issued to the Filer & Stowell Co., Milwaukee, for a one-story brick and reinforced concrete foundry, 60 x 108 ft., at Robinson Avenue and Becher Street. The value is given as $21,000. The William F. Tubesing Co., Wauwatosa, is general contractor.

The C. A. Lawton Co., DePere, Wis., founder and machinist, expects to occupy a two-story addition, 50 x 120 ft., on Aug. 1, which will make the main building 120 x 180 ft. in size. A blacksmith shop, 38 x 40 ft., will be located on the main floor and the upper story will be used as a pattern shop and wood-working room. The present pattern shop will be used for stock. A new boiler room, 36 x 40 ft., is also being erected.

The Janesville Machine Co., Janesville, Wis., since July 1 in control of the General Motors Corporation, Detroit, has engaged Frank D. Chase & Co., consulting engineers, Chicago, to design and erect a tractor manufacturing plant costing approximately $200,000. Details are not yet available, but it is stated that the group will consist of foundries, machine shops, assembling floor, shipping building, warehouse, etc.

George Morrison & Brother, Portage, Wis., have opened a small machine shop at Jefferson and Pleasant streets, for the manufacture of cutting tools.

Chicago

CHICAGO, July 15.

Business continues exceedingly good in this section, in fact it is doubtful if at any time heretofore there has been such a steady volume of orders. Several deals of good size have been consummated, or are pending, while the aggregate of small orders is great. It is reported that deliveries of milling machines have never been so difficult as at present. Turret lathes, on the other hand, are easier of delivery, so far as the smaller sizes are concerned.

The New York Central Railroad is placing orders against its list, recently issued. The Monon Route is also in the market.

The tractor and gas engine makers having war business have figured as large buyers. The Falls Motor Corporation, Shebogan Falls, Wis., has purchased machines valued at over $130,000. Its motors are used in tractors. The J. I. Case Threshing Machine Co., Racine, Wis., is increasing the capacity of its tractor department and is buying about $150,000 worth of tools. Additional buying has been done by the Interstate Motor Co., Muncie, Ind., which is making small tractors of the caterpillar type for hauling field ordnance on the other side. Heavier tractors are used until the guns are near the front; the small tractors do the rest. They are equipped with 8-cylinder Cadillac engines, and are said to be capable of a speed of 20 miles per hr.

The Great Lakes Naval Aviation School, Great Lakes, Wis., now has about 200 tools housed in a building 600 ft. long, in which young men will be taught the construction and repair of airplanes. The plan is to divide the machines now installed into 35 units, each in charge of an instructor.

Construction of the big plant of the Symington-Chicago Corporation is going forward rapidly. Permits have been issued for three buildings to cost $220,000. The main structure will be 350 x 2100 ft., for which plans have not yet been completed.

It is reported that the Studebaker Corporation, manufacturer of automobiles and vehicles, South Bend, Ind., has been assured of all the shell business it can handle in the next two years. It already has orders aggregating $20,000,000. The Government is building the shell plant, but when shell work is concluded the company may acquire the plant if it so desires. Permits for buildings to cost $300,000 have been obtained, consisting of forge and machine shops.

The local machinery trade is much interested in the Baldwin Locomotive Works' project to build a large plant on land it has owned for several years at East Chicago, Ind. It is felt that much of the initial buying will be done in the East, yet Chicago is the logical market for a plant at East Chicago, and in the future at least a new and important buyer is indicated for this city.

Contracts have been placed for a two-story factory, 225 x 404 ft., at 3020 to 3058 West Lake Street, Chicago, for the A. B. Dick Co., manufacturer of labor saving devices. The building will be of mill construction and cost about $400,000. Work has been started.

The E. L. Archibald Co., 111 West Washington Street, Chicago, has the contract for a two-story factory, 40 x 200 ft., at North Chicago, Ill., for the Chicago Hardware & Foundry Co., to cost $25,000.

The Monarch Electric & Wire Co. has purchased the leasehold and buildings, 99 x 100 ft., it occupies at Adams and Desplaines streets, Chicago.

Further contracts have been let for the block of five and six-story factories to be erected at Hawthorne, Ill., for the Western Electric Co. They will be of steel and reinforced concrete, with pressed brick and terra cotta exteriors, composition roofs, iron doors, steel window frames, and have all the latest improvements. The cost will be $1,000,000. Walter R. Kattelle is architect and Charles B. Brown is the mechanical engineer. When the latest group of buildings is completed the plant will consist of 73 buildings.

The Government has leased all but the main floor of a six-story and basement building, 84 x 150 ft., at Superior and St. Clair streets, Chicago, which will be occupied by the Ordnance Department, of which Edmund A. Russell is the division chief for the Chicago district. The building will provide space for 500 officers and employees.

The Remy Electric branch of the United Motors Corpora-

tion, Anderson, Ind., will erect a four-story factory extension, 50 x 300 ft. Davis & Hunt, Dayton, Ohio, have the contract.

The Connolly Iron Sponge & Governor Co., Morgan and Twenty-second streets, Chicago, is having plans prepared for a new one-story and basement plant, 50 x 150 ft., on property recently acquired near California Street, Sanitary Canal. nated to cost $25,000.

Co., West Jackson Boulevard, Chicago, nimeograph machines, etc., has broken istruction of a two-story plant, 200 x 400 et and Albany Avenue, to cost about

ngineering Co., South Washtenaw Avenue, out a permit for a new one and two- at 2647-53 West Van Buren Street, to

eel Co., South Wood Street, Chicago, is ne-story foundry, 130 x 300 ft., to cost

thers Handle Co., Fort Madison, Iowa, wo-story factory, 100 x 250 ft., on Fac- , Ill., to cost about $100,000.

Aeronautical Corporation, Chicago, has n Delaware with a capital of $1,000,000 craft. H. A. Fein, R. L. McVean and incorporators.

ry plant, 70 x 140 ft., to cost $200,000, he Sprague Tire & Rubber Co., Twenty- , Neb. F. P. Gould & Son, City National the contractors.

Detroit

DETROIT, July 15.

e consts ux of war orders continues to hold the chi e tool : above normal. Numerous inquiries for ade machines for munition work were received last Dealers report their business much better than last at this time Milling machines, grinders and boring ines have in especial demand. Delivery on them requires three or four months. In general manufac- ing lines business is slack, due to difficulty in obtaining terial. Machine for these concerns are also difficult to tain. The g increased business of munition making ncerns has than counteracted dullness in other ges. Practically every metal-working concern in this dis- rict is working on war orders. The coal situation remains unrelieved, and Detroit munition makers are appealing to the Governm aid.

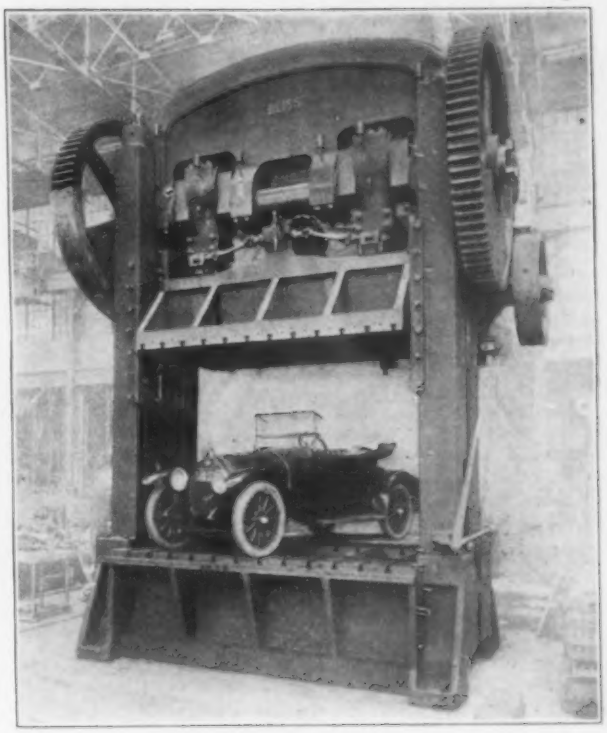
Labor is still rce, Detroit alone being 30,000 to 40,000 undersupp igh wages are being paid, and the scarcity h employees to work as they will, great- ly incre bor turnover cost. Many concerns are refusing to train an for work on more than one machine until the ntention of working regularly.

orporation has secured a $50,000,000 or- h will necessitate enlargements at the lant, and the conversion of some of its automobile work.

ontracts awarded by the Government to rers are the following: The National ., Detroit, 6000 rear spring shackle sub-assemblies and 1000 additional spark and throttle control assemblies; Edmunds & Jones Co., Detroit, 1000 lamps; Hayes Mfg. Co., Detroit, gasoline strainer funnels and 400 engine dustpans and various parts; Champion Ignition Co., Flint, spark plugs; Michigan Screw Co., Lansing, pedal shafts, engine support bolts, brake equalizer pins, rear spring shackle pins, rear spring front bracket pins; Michigan Stamping Co., Detroit, fenders; Lincoln Brass Co., Detroit, radiator drain cocks; Steel Products Co., Detroit, 5000 starting crank assemblies and 5000 reachrods; National Can Co., Detroit, 8000 water cans; Gier Pressed Steel Co., Lansing, 4000 sprag assemblies and 4000 radiator guards; Detroit Gear Co., Detroit, 4000 clutches; Detroit Copper & Brass Rolling Mill Co., Detroit, copper sheets; Wickes Boiler Co., Saginaw, boilers; Benton Harbor Foundry, Benton Harbor, sheets, chains; National Twist Drill Co., Detroit, steel cutters; Union Steel Products Co., Albion, metal; Ford Motor Co., Detroit, ambulances and parts; Hoover Steel Ball Co., Ann Arbor, steel balls; General Aluminum & Brass Mfg. Co., Detroit, casting sets; Shaw-Walker Co., Muskegon, steel filing cabinets; General Motors Truck Co., Pontiac, truck parts and box carriers; Lansing Co., Lansing, wheelbarrows; Clayton & Lambert Mfg. Co., Detroit, blow torches; Studebaker Corporation, Detroit, auto parts; American Logging Tool Co., Evart, logging tools and peavies; Republic Motor Truck Co., Alma, assembling trucks; Blackmer Rotary Pump Co., Petoskey, pumps; Schwepper & Wilt Co., Detroit, various parts; Continental Motors Corporation, Detroit, various parts; Packard Motor Car Co., Detroit, various parts; National Standard Co., Niles, jacks; Lufkin Rule Co., Saginaw, steel scales, steel arrows, chain tops, tape repair outfits; Dodge Brothers, Detroit, motor parts; Ideal Engine Co., Lansing, pulleys; W. H. Anderson Tool & Supply Co., Detroit, machinist punches; Penbarthy Injector Co., Detroit, valves and injectors; Joseph N. Smith, Detroit, deck fixtures, cover plates and clamps; Detroit Brass Works, Detroit, valves; Evart Forge Co., Evart, forgings; American Injector Co., Detroit, injectors.

Among the contractors for ordnance material are: The American Brass Goods Co., Grand Rapids; Olympian Motors Co., Pontiac; Hugh Lyons Co., Lansing; Keller Pneumatic Tool Co., Grand Haven; M. & S. Co., Detroit; Maxwell Motor Co., Detroit; Marble Arms & Mfg. Co., Gladstone; Clipper Belt Lacer Co., Grand Rapids; Industrial Works, Bay City; Michigan Copper & Brass Co., Grand Rapids; J. E. Bolles Iron & Wire Co., Detroit; Commerce Motor Car Co., Detroit; Dow Chemical Co., Midland; Dodge Brothers, Detroit; Packard Motor Car Co., Detroit; Wilson Body Co., Detroit; American Car & Foundry Co., Detroit; Vincent Steel Process Co., Detroit; Timken-Detroit Axle Co., Detroit; Detroit Steel Castings Co., Detroit; Oliver Machinery Co., Grand Rapids.

The Olds Motor Works, Lansing, Mich., will spend over $1,000,000 for the construction of a new motor plant. Up to now the engine or power plant used in Oldsmobile cars was made by the Northway Motor & Mfg. Co., Detroit, but due to the great number of war orders of that company it will be impossible to do anything but Government work, and for this reason the Olds company will have to make its



A Complete Automobile Is Not Stamped Out at Each Stroke of This Large Double Crank Bliss Press. Some Idea of Its Capacity Can Be Gathered from the Subjoined Specifications:

Width between uprights, in.	150
Width between gibs, in.	141
Depth of standard opening in bed, in.	36
Width of standard opening in bed, in.	120
Standard stroke of slide, in.	20
Maximum stroke of slide, in.	24
Adjustment of slide, in.	6
Distance between bed and slide arranged for standard stroke, in	78
Depth of slide, in.	72
Width of slide, in.	140
Diameter of large gear, in.	108
Ratio of gearing	75:1
Diameter of flywheel, in.	56
Face width of flywheel, in.	12
Weight of flywheel, lb.	3,700
Diameter of tight and loose pulleys, in.	48
Face width of tight and loose pulleys, in.	12
Speed of tight and loose pulleys, r.p.m.	375
Diameter of shaft, in.	15
Diameter of crank pin, in.	16
Height from floor to center of shaft, in.	164
Over all height, in.	236
Floor space required, in.	148 x 265
Complete weight, lb.	400,000

own motors. There will be a factory building, 240 x 500 ft., and a concrete loading dock. The construction will cost $600,000, with $500,000 expended for plant equipment.

The Frank Brothers Iron & Metal Co., Detroit, has purchased the plant and most of the equipment of the bankrupt American Motor Co., located at Copeland Avenue and the Michigan Central Railroad. The building is one story, and has about 40,000 ft. of floor space.

The Bay City Auto Body Co., Bay City, Mich., has sold its business to Amil A. Dentz, who will continue the enterprise on a larger scale under the same name.

The Clark Equipment Co., Buchanan, Mich., has bought the factory equipment and other belongings of the Buchanan Cabinet Works, and the latter will close its business within the next 60 days. The South Bend Gear Co., South Bend, Ind., of which the Clark company is the principal owner, will be moved to Buchanan.

The plant of the American Machine Corporation, Port Huron, Mich., which was commenced a month ago to replace their wrecked factory, is nearly completed. The building is 103 x 300 ft. Carloads of new machinery are en route and many of the old machines of the wrecked plant were salvaged and are now being repaired.

The Saxon Motor Car Corporation, Detroit, has removed its general offices to 917 Beaufait Avenue, Detroit, directly across the street from its main plant.

The Wisconsin Bridge & Iron Co., Detroit, which has its general offices in the Penobscot Building, has obtained a building permit for the erection of a unit which will cost $70,000. The structure will be located at 278-292 Guoin Street and will be one, two and three stories.

The Hoskins Mfg. Co., Lawton Avenue, Detroit, manufacturer of wire products, pyrometers, etc., will build a one-story foundry, 60 x 100 ft.

The Michigan Central Railroad, Detroit, has awarded contract to the Walbridge Aldinger Co., Penobscot Building, for the erection of a boiler and tank shop at Jackson, Mich.

Indianapolis

INDIANAPOLIS, July 15.

Contract has been let for a four-story addition, 50 x 300 ft., to the Remy branch of the United Motors Corporation, Anderson, Ind.

The Graham Valve Co., Boonville, Ind., is preparing plans for a factory, 50 x 235 ft., and an office building, 30 x 50 ft. The machine shop, foundry and core room will be one story, with steel trusses and monitor roof.

The Indiana Brass Co., Frankfort, Ind., has increased its capital stock from $100,000 to $300,000.

The Service Motor Co., Wabash, Ind., has let contracts for five one-story buildings, each 75 ft. wide, with a total length of 1350 ft. It has a Government contract for 10,000 military trucks.

The Kokomo Steel & Wire Co., Kokomo, Ind., contemplates the erection of two additional buildings, at an estimated cost of $100,000. It is manufacturing barbed wire for the Government.

The Studebaker Corporation, South Bend, Ind., has taken out building permits for three buildings to cost $270,000, consisting of a one-story brick and steel forge shop, 162 x 306 ft.; concrete machine shop, 200 x 576 ft., and a crane runway.

The Kerosene Manifold Co., Indianapolis, has been incorporated with $200,000 capital stock to manufacture automobile parts. The directors are Harry B. Hyatt, S. Albert Salmon, J. G. Purdy, Patrick E. Muraine and Fred G. Morgan.

The Bedford Foundry & Machine Co., Bedford, Ind., has increased its capital stock from $100,000 to $175,000.

The Willard F. Meyers Diamond Saw Co., Bedford, Ind., has increased its capital stock from $16,000 to $75,000.

The Hironimus Tractor Co., Mount Vernon, Ind., has been incorporated with $50,000 capital stock to manufacture tractors. The directors are Fred W. Hironimus, Eberhard B. Schenk and Henry Schreiber.

The Peerless Weed Puller Mfg. Co., Indianapolis, has been incorporated with $100,000 capital stock to manufacture weed pullers and other implements. The directors are H. C., E. E. and A. E. Johnson.

The Mall Steel Range Co., South Bend, Ind., is building a two-story addition to its plant, about 25 x 90 ft., to cost $10,000.

The Indiana Truck Co., Marion, Ind., is planning for the construction of a one-story building, 50 x 250 ft., on Sanitare Avenue.

The Central South

LOUISVILLE, July 15.

Business has been a little quiet with foundries and machine shops not working on Government orders, and there has been a scramble for business the past few weeks. Boilers and ice plant equipment have been in better demand. Local manufacturers are awaiting further announcement relative to the erection of the Federal powder plant here, which will require boilers, tubes, etc.

The Continental Car Co. of America, Highland Park, Ky., has increased its capital stock from $400,000 to $500,000.

The Southern Foundry Co., Owensboro, Ky., has increased its capital from $60,000 to $100,000.

The O. K. Sheet Metal Works, Louisville, has been incorporated with a capital of $1,200 by John V. Kempner, Jacob Koenig and John D. Painter.

With a capital of $25,000 the Superior Welding Co., Louisville, has been incorporated by George G. Montz, Edward C. Stoecker and William Ritter.

The American Elevator & Machine Co. will erect a foundry at a cost of $4,000.

The Black Raven Coal Co., Willard, Ky., is in the market for motor-driven coal mining equipment, coal cutting machines, screens, tipple, scales, etc.

The Eastern Imperial Oil Co., Huntington, W. Va., is in the market for oil well casing and tubing.

The Greensboro Machine Co., Greensboro, N. C., wants dealers' price on a 10 hp., 220 volt, 60 cycle, three phase motor; shaper and milling machine; 16 or 18-in. screw cutting engine lathe, and 20 to 26 in. drill press.

The Eureka Machine Tool & Supply Co., Winchester, Ky., which recently took over the McJunkin Machine Co.'s plant, is opening a branch plant at Beattyville, Ky.

The Louisville & Nashville Railroad Co., Louisville, has commenced the rebuilding of its car wheel and axle shop, recently destroyed by fire. The new structure is estimated to cost about $50,000.

The Ohio Falls Dye & Finishing Co., East Madison Street, Louisville, will build a one-story plant, 60 x 160 ft., for the manufacture of air-plane parts.

St. Louis

ST. LOUIS, July 13.

The Sevier County Gin Co., De Queen, Ark., H. H. Cooper, president, will equip a ginnery with four 80-saw gins, electrically operated. Machinery is now wanted.

The Holden Electric Light & Power Co., Holden, Mo., will rebuild its plant destroyed by fire.

The Garber Light & Ice Co., Garber, Okla., William Musser, president and manager, will equip an electric light and power plant requiring about $10,000 worth of new machinery.

The Southwestern Milling Co., Kansas City, Mo., will equip an additional plant with a daily capacity of 3600 bbl. for which machinery is now wanted, also power plant equipment.

The A. Gilbert & Sons Brass Foundry Co., St. Louis, has increased its capital by $50,000 and will purchase additional equipment.

The Gasteam Radiator Co., Oklahoma City., Okla., H. R. Hoffman and others interested, will equip a foundry and a machine shop in connection therewith.

The Otero Oil & Refining Co., Oklahoma City, Okla., has been incorporated with a capital of $300,000 by C. B. Pash, M. M. Thompson and C. M. Walker and will equip a refinery.

The Jefferson Hardwood Lumber Co., Tucker, Ark., headquarters at Pine Bluff, Ark., Thomas R. Ashcraft, president, will equip a band saw mill with an annual capacity of 6,000,000 ft.

The Delta Shipbuilding Co., New Orleans, La., R. B. Sanford, president, Metropolitan Bank Building, has acquired a site and will equip a plant to build concrete ships.

Harding, Mo., will equip a water works plant and is in the market for about $20,000 worth of machinery. W. B. Rollins & Co., Kansas City, Mo., are the engineers.

The Henry Wrape Co., Paragould, Ark., will equip a plant to cost $50,000 for the manufacture of staves, etc.

The Conway Compress Co., Conway, Ark., will add about $40,000 worth of equipment to its plant.

The A. Gilbert & Sons Brass Foundry Co., St. Louis, has increased its capital from $50,000 to $100,000.

The Rocky Ford Milling & Electric Co., Manhattan, Kan., is having plans prepared for the erection of a new power plant.

John Wilkes, Harrisville, Mo., as commenced the erection of a one-story foundry to cost about $8,000.

Texas

AUSTIN, July 13.

The city of Stamford will issue $240,000 in bonds, the proceeds to be used for a waterworks system.

The Blumberg Mfg. Co., San Antonio, will build a plant at Orange for the manufacture of farm tractors.

Garrow, MacClain & Garrow, Houston, has been incorporated with a capital stock of $50,000 and will construct J. W. Garrow is a stockholder.

Glass Mfg. Co. has concluded negotiations hamber of Commerce and will build a),000. Henry Wagner, Tulsa, Okla., is mpany. It is stated that the plant will about 150 men.

nnings Co., Rio Hondo, will build a cot- 000.

ck & Tile Corporation, Elgin, has been capital stock of $100,000 and will con- he incorporators are S. F. Kirksy, Jr., I. R. Burt.

ivernment has awarded the contract for army machine and motor shops at San nerican Construction Co., Houston. The roximately $1,500,000.

s Shipbuilding Co., Orange, has acquired the Sabine River at that place as a site plant. It is stated that the company has al of $5,000,000 and that the proposed ng the largest in the South. Work of and preparing the site for the buildings once.

Refining Co., Wichita Falls, which has a 25,000, will build an oil refinery with a 000 bbl. J. W. Aiken, Lake Charles, La., vice-president.

Supply Products Co., Beaumont, will in- the manufacture of cement building owell is a stockholder.

filling Co., Denton, will install new ma- other improvements to its flour mill and

Telephone & Telegraph Co., Waco, Tex., ated in Delaware with capital of $80,000 elephone and telegraph apparatus. J. B. F. Adams and H. L. Gary, Kansas City, porators.

aritime Corporation, Orange, Tex., is plan- ilding of its shipbuilding plant, recently ith loss estimaated at $100,000.

nstrong & Co., Fort Worth, Tex., is plan- rgement of its works and the installa- ment for the manufacture of oil well sup-

California

LOS ANGELES, CAL., July 11.

les Shipbuilding & Drydock Co., San Pedro, filed plans for additions to its shipbuilding Island, to consist of a one-story plate shop, 56 x 80 ft.; one-story erecting shop, 100 x 112 ft.; and a one-story extension to the joiner shop, 70 x 200 ft.

The Emergency Fleet Corporation, Washington, has completed negotiations with the City Council, San Diego, Cal., for a lease of water front property near National City for a new shipbuilding plant. The site has a frontage of about 5000 ft. of tidelands, and will allow for four shipways with shop buildings. The plant, it is understood, will be constructed by the Schofield Engineering Co., San Francisco, which has a Government contract for building tankers.

The Hercules Carburetor Co., Los Angeles, has been incorporated with a capital of $100,000 by E. M. Hitchcock, Herbert V. Leahy and F. E. LaFehr, all of Los Angeles, to manufacture carburetors.

The Los Angeles Aircraft Co., Los Angeles, has been incorporated with a capital of $400,000 by R. K. Snow, E. H. Moore and H. I. Chatfield.

A one-story machine shop will be constructed by the Government in connection with the new balloon instruction station at Arcadia, near Los Angeles. The C. J. Kubach Co., Los Angeles, is the contractor.

The electric power plant of the Hazel Creek Gold Mining Co., Crystal Creek, near French Gulch, Cal., was destroyed by fire June 27, with loss estimated at $30,000.

The Pioneer Boiler & Machine Works, Palmetto and Carolina streets, Los Angeles, has been incorporated with a capital of $100,000 by L. J. and V. E. Maescher, and C. F. Sammann.

A two-story reinforced-concrete power plant, 85 x 154 ft., will be constructed by the California Associated Raisin Co., Fresno, Cal., at its works at Sun Maid City.

The board of education, Santa Barbara, Cal., has had plans prepared for remodeling an existing school building for a machine and industrial shop for manual training work.

The Muller Shipbuilding Co., Los Angeles, recently incorporated, has completed arrangements for a new shipbuilding works at San Pedro, Los Angeles Harbor, on a site of 30 acres on the west basin. Luis and A. B. Cass, J. W. Dunham and S. G. Lynch are interested in the company.

The Pacific Air Compressor Co., Los Angeles, has filed notice of organization to operate a works at 917 South Grand Avenue. Walter H. Fisher heads the company.

The West Coast Shipbuilding Co., Los Angeles, recently incorporated in Arizona with a capital of $1,000,000, has filed local papers to provide for the operation of a shipbuilding plant in this vicinity. C. C. Spicer and A. G. Keating, H. W. Hellman Building, Los Angeles, head the company.

The California Cornice Works, 1610 San Fernanco Road, Los Angeles, has increased its capital from $75,000 to $250,000.

In connection with the new aeronautical school to be constructed by the Government on North Island, San Diego, Cal., each hangar will be provided with an individual machine shop. A carpenter shop will also be erected. The entire works will consist of six structures to cost $350,000.

The Nevada-California Power Co. and its subsidiary, the Southern Sierras Power Co., both at Riverside, Cal., are planning to increase the capacity of their power plants known as Nos. 2, 3, 4, 5 and 6 at Birch Creek, Inyo County, at an estimated cost of $85,000.

The Ensign Carburetor Co., Los Angeles, has leased property on East Seventeenth Street, near Los Angeles Street, for a new plant. It has been operating a local works with output of about 25 carburetors per day and will equip the new plant for a production of about 500 carburetors per day.

The Pacific Northwest

SEATTLE, July 9.

Continued losses of skilled men in the shipyards by reason of the draft have become so marked that a concerted action may be taken by the managers of various plants to impress upon Washington the necessity of keeping these workers. Expert mechanics and special office men have been taken to such an extent that the working organizations so carefully built up have in many cases been demoralized.

The freight situation has not improved the past two weeks. Many industrial plants have been hampered by slow delivery of tools and machinery from Eastern points. Difficulty in obtaining any degree of promptness in shipment is keeping local plants swamped with work.

Reports from the West coast lumber mills show that the car supply has dropped below normal and mills are unable to ship all of the lumber produced. Production has been kept near normal, although labor shortage is reported in camps and mills.

The Norway-Pacific Construction & Dry Dock Co., Everett, which is erecting a shipbuilding plant, has increased its capital stock from $1,000,000 to $3,000,000 to permit of additional expansion.

The Valveless Pump & Foundry Co., Portland, has leased a site on which will be erected a machine shop and foundry. The machine shop will cost about $4,000, exclusive of equipment.

The Northwest Motor Co., Seattle, plans the immediate erection of a foundry and machine shop on the Duwamish Waterway to cost about $150,000 for the initial unit. A. P. Nute is president. The foundry will be 90 x 250 ft., equipped with iron melting cupola, electric steel furnace and overhead traveling crane.

The Schaake Co., Ltd., Vancouver, B. C., will enlarge its machine shops, storehouse, and other structures, and will erect new pattern shops and foundry, 40 x 120 ft.

The Cummings-Moberly Lumber Co., Tillamook, Ore., will construct a sawmill with a daily capacity of 100,000 ft.

Plans have been completed for the proposed lumber mill and box factory to be erected at Reedsport, Ore., by R. J. Hubbard and Warren Reed. The main building will be 54 x 300 ft. and will have a daily capacity of 150,000 ft. for the first unit.

The Johnson Sawmill, Coquille, Ore., was destroyed by

fire recently with loss of $50,000. It is reported that the plant will be rebuilt at once.

The Todd Drydock Co., Seattle, will construct a two story power house and storehouse building, 50 x 100 ft., to cost about $10,000.

The Seattle Pipe & Galvanizing Co., Seattle, has awarded contracts for the construction of its new plant for galvanizing ship supplies and heavy hardware. The complete cost will be $40,000.

The West Coast Shipbuilding Co., Everett, Wash., has received Government contracts for building concrete ships amounting to $2,000,000.

The American Pipe & Shipbuilding Co., Tacoma, announces that a 12-acre site at Bryn Mawr, on Lake Washington, has been leased for 25 years as a site for its proposed concrete shipbuilding plant. Work will begin within 30 days. Plans provide for five ways for 10,000 ton ships; two ways for 100 to 200-tons, and one way for barges 120 ft. long. A large cement pipe plant is also planned. L. Y. Stayton is president.

Columbia River Shipbuilding Co., Portland, has started work on installing two new ways, which will give it a total of five ways for building 8800 ton steel vessels.

The Foundation Co., Portland, which is building 20 steel ships for the French Government, will make extensive additions to its blacksmith shop. Some new equipment will be installed.

The Inter-Ocean Barge & Transport Co., Seattle, has completed plans for the establishment of its proposed concrete ship plant on the Duwamish Waterway. Contracts are held for two concrete vessels with deadweight tonnage of 1200 and 1500 tons. It has a temporary plant on Ballard Beach.

Puget Sound Navy Yard, Bremerton, Wash., has received a contract for building an ammunition ship and seven mine sweepers at a cost of $7,500,000.

The Puget Sound Bridge & Dredging Co., Seattle, has received a Government contract for the first 5000-ton wooden ship to be built on the Pacific Coast.

The Lamb Machine Co., Hoquiam, Wash., which is building a large machine shop, will make extensive additions at a cost of $50,000.

It is reported that the Northwest Steel Co., Portland, is negotiating with the United States Shipping Board for the establishment of a new shipbuilding plant in Portland to employ 7000 men. Joseph R. Bowles is president.

The Rathdrum Iron Works, Spokane, Wash., has been sold to Charles F. Burrell, who took possession at once.

The Stuvland Machinery Co., Everett, Wash., has been incorporated with a capital of $50,000 by Gust Anderson, Andrew Nyelin and associates.

The Albina Engine & Machinery Works, Portland, is enlarging its plant to provide for the fitting out of vessels.

The American Tug Boat Co., Everett, Wash., will build a machine shop. A site has been secured and construction will commence at once.

Canada

TORONTO, July 15.

The Ford-Smith Machine Tool Co., Ltd., Hamilton, Ont., has purchased a site of about one acre and will soon commence the erection of a large plant to cost about $250,000. It recently secured some big orders which cannot be handled in the present premises.

It is announced that the Manitoba Bridge & Iron Works, the Vulcan Iron Works and the Dominion Bridge Co., all of Winnipeg, are about to accept contracts from the United States Government for turning out 80,000 3-in. shells each, work to begin as soon as the necessary machinery can be installed. This contract is part of a $1,000,000 order given to the six munitions plants of the Prairie provinces, three of which are located in Winnipeg, one in Moose Jaw, Sask.; one in Medicine Hat and one in Edmonton, Alberta.

The Hamilton Brass Co., Hamilton, Ont., has taken out a permit for the erection of a factory on Main Street to cost $25,000.

The contract for the shipbuilding plant at Halifax, N. S., for the Halifax Shipyards, Ltd., has been awarded to the Bedford Construction Co. It is stated that the first three berths will be completed within three months when construction will be started on the order for steel ships of 10,000 tons.

The National Shipbuilding Co., Goderich, Ont., will build a boiler shop, to cost about $40,000. A site has been purchased adjacent to its plant on Maitland Road and work will commence at an early date.

M. O. Crowder has opened a machine shop at 10 Lansdowne Avenue, London, Ont., to be known as the Crowder Machine Shop and will carry on a general machine shop business.

The Dominion Shipbuilding Co., Ltd., which is establishing shipyards on the water front near Bathurst Street, Toronto, has been incorporated with a capital stock of $3,000,000 by J. M. Bullen, Norman S. Robertson, 10 King Street East, and others. L. Dahlgren is general manager. The plant will represent an expenditure of $1,000,000.

The Defiance Packing Co., Ltd., Vancouver, B. C., has taken out a permit for the erection of a packing plant to cost $50,000, which will be equipped with considerable refrigerating machinery. A. H. Sherman is general manager.

The Ogilvie Flour Mills Co., Winnipeg, has taken out a permit for the erection of an 11-story cleaning elevator to cost $250,000.

R. S. Walker, Grand Prairie, Alta., is preparing plans for the erection of a planing mill to cost $60,000.

The town of Meota, Sask., will build an electric light plant at a cost of about $40,000. A. E. Thompson is secretary-treasurer.

The Provincial Hydroelectric Commission has recommended that the town of Smiths Falls, Ont., purchase four electric pumps at a cost of $20,000. J. A. Lewis is clerk.

The Wentworth Mfg. Co., Ltd., Toronto, has been incorporated with a capital stock of $300,000 by Carroll D. Dyke, 10 King Street East; Robert G. Brownlee, Ernest W. McNeil, and others, to manufacture machinery, tools, etc.

The Canadian Hoskins, Ltd., Walkerville, Ont., has changed its name to Hiram Walker & Sons Metal Products, Ltd., and increased its capital stock from $40,000 to $250,000, to carry on the business of foundryman, wire manufacturer and machinist. It has awarded contract for the erection of an addition to cost $65,000.

The Clyde Car Co. of Canada, Ltd., Toronto, has been incorporated with a capital stock of $50,000 by John S. McLaughlin, 233 Inglewood Drive; John S. Innes, 19 Woodlawn Avenue; William P. Armstrong and others, to manufacture automobiles, engines, motors, etc.

The Kent Oakley, Ltd., Toronto, has been incorporaated with a capital stock of $40,000 by Alfred W. Briggs, 33 Richmond Street West; Ernest M. Dillon, 56 Ashburnham Road; Ray T. Birks and others to manufacture wood products, etc.

The North Light Motor Co., Ltd., New Hamburg, Ont., has been incorporaated with a capital stock of $50,000 by Charles O. Peters, Toronto; Alexander H. Miller, Owen Hamilton, and others of Kitchener, Ont., to manufacture engines, motors, boilers, machinery, etc.

The Lymco Corporation, Ltd., Montreal, has been incorporated with a capital stock of $300,000 by Joseph E. Hurtubise, Joseph L. Lemieux, Philip Reynolds and others to manufacture munitions, metals, etc.

The Canadian Refractories, Ltd., Montreal, has been incorporated with a capital stock of $20,000 by Peter Bercovitch, Ernest Lafontaine, Nathan Gordon and others to manufacture brick, pipe, etc.

The Globe Engineering Co. of Canada, Ltd., Winnipeg, has been incorporated with a capital stock of $100,000 by Oliver F. Lightcap, John L. Harrison, Alexander J. Milligan and others to manufacture engines, dynamoes, generators, batteries, machinery, etc.

The T. H. Taylor Co., Ltd., Chatham, Ont., is in the market for a 14, 16 or 18 ft. 125 to 150-hp. boiler, 6 ft. in diameter with 3½ in. flues, fitted with Jones underfeed stoker, etc.

Government Purchases

WASHINGTON, July 15.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, on the dates and under the specifications, as follows: July 19—Schedule 4898½, for Philadelphia, 1 motor-driven shaper; 4913½, for Washington, 1 2-ton electric hoist; 4967½, for Philadelphia, 1 milling machine; 3968½, for Boston, 2 8-in. patternmakers' lathe and 1 6-in. patternmakers' lathe. July 22—4899½, for Washington, 4 motor head lathes; 4900½, for Washington, 4 bench grinders; 4901½, for Washington, 1 motor-driven lathe; 4902½, for Washington, 1 motor-driven gap lathe; 4949½, for Brooklyn, 12 motor-driven planers, 12 motor-driven jointers and 12 motor-driven bandsaws; 4950½, for Brooklyn, 6 universal and cutoff machine tools; 4951½, for Brooklyn, 6 wet tool grinders; 4952½, for Brooklyn, 6 vertical shapers. July 26—4954½, for Mare Island, 1 hydraulic tire forcing press with electric motor.

The chief clerk, Department of Commerce, Nineteenth Street and Pennsylvania Avenue, N. W., Washington, will receive sealed proposals under proposal 8427 till 2 p. m. July 22 for furnishing special machine parts.

NEW TRADE PUBLICATIONS

Shell Making Machine Tools.—Gisholt Machine Co., Madison, Wis. Folder SM-1. Concerned with a line of special s for performing various manufacturing ction with the production of shells. These y's special 16 and 25 in. lathes, and a g lathe which was illustrated in THE IRON 18. The folder is given over almost en- s of the different machines and the equip- upplied with them.

truction.—Frank D. Chase, Inc., Peoples cago. Pamphlet entitled "The Modern ed with the various problems entering into nstruction of modern foundry plants. The prepared for presentation before the Phil- en's Association, and the questions of lo- struction are all gone into at some length, plemented by numerous illustrations of e been designed and built by this organi-

amshell Bucket.—Blaw-Knox Co., Pitts- ncerned with a single-line type of clam- is completely automatic in operation and desired, from the crane or derrick. The e operation of the bucket are illustrated n the pages facing the engravings.

Por es.—Buffalo Forge Co., Buffalo. Catalog ntains illustrations and brief descriptions e forges, and is the first of a series of hich is being issued from time to time to e former large catalog which covered all ge which has been made is the renumber- y a combination of three figures and a eral indicating the blower, the second the d the size of hearth, while the style of the letter following the number. For numbers are given in parenthesis in a d numerical indexes, one arranged in the new numbers and the other arranged in der of the new and old numbers, are in- covered include rivet, repair, toolmakers, iths, brazing and special types for mili-

erators.—Crocker-Wheeler Co., Ampere, . The first, No. 183, superseding No. 157, of motor drive for printing machinery, h as increased output, ease of control, exibility of arrangement and increased touched upon, and the text is supple- illustrations of various types of print- ped in this way. The second, No. 184 3, deals with a line of direct-current generators, which are built in the direct- ine types in capacities ranging from construction is gone into at some length, lemented by illustrations of the various tin, No. 158, superseding No. 150, treats types of alternating-current generators nd three phase current. The arrange- is bulletin is practically the same as in the preceding ones, except that a view of the generator dis- assembled and with the various parts numbered is included.

Belt Dressing.—Joseph Dixon Crucible Co., Jersey City, N. J. Booklet entitled "The Proper Care of Belts." Lists the cause of slipping belts which are stated to be neglect and overloading and points out the results of such slippage which are a waste of power and frequent belt renewals. The various kinds of belt dressing which the company can supply are briefly described with directions for their application. A number of useful facts about belts and their uses are included.

Concrete Mixer.—Lakewood Engineering Co., Cleveland. Bulletin No. 32. Gives general description and specifications for a low-charging universal mixer designed for concrete construction work of all kinds. The description is supplemented by a number of views of the various parts together with engravings of the mixer in use.

Drum Controllers.—General Electric Co., Schenectady, N. Y. Three circulars. The first, No. 68200-A superseding No. 68200, pertains to a line of drum controllers for two or three phase, 110 to 550 volt, slip ring induction motors; the second, No. 68202, describes and illustrates controllers for series, shunt or compound wound motors, and the third, No. 68204, refers to controllers for use with direct-current adjustable-speed motors for driving machine tools. All of the controllers can be supplied for either reversing or non-reversing service, and the general makeup of each circular is the same, the several sizes making up the different lines being illustrated in each case, while the particular features are brought out by a series of panels grouped around an illustration of the controller and diffension tables are included.

Spindle Drilling Machine.—Charles Stecher Co., 1574 Crossing Street, Chicago. Circular. Illustrations and descriptive matter explain the operation of a machine for drilling holes in lathe spindles and work of a similar character. The special feature of this machine is that the drill is vertical and feeds up into the work, thus preventing the drill point from being clogged with chips. A condensed table of specifications of the machine, which was illustrated in THE IRON AGE, Sept. 13, 1917, is included.

Industrial Haulage Systems.—Lakewood Engineering Co., Cleveland. Bulletin No. 25. Illustrates and describes a trackless system for haulage in industrial plants which comprises a number of types of storage battery trucks, trailers, and tractors. Besides illustrating the different members of the system, a number of views of the different trucks and combinations in use are included.

Die Sinking Machines.—Jackson Machine Tool Co., Jackson, Mich. Catalog. Devoted to a duplex typeless die sinking machine, which is designed to turn out drop forging dies at a low cost and in a short space of time. The construction of the machine is gone into at some length, and the text is supplemented by illustrations of the complete machine and some of the more important parts. A number of installation plans and views of work produced by the machine are included.

Woven Wire Fence.—Knapp Fence Co., Cleveland. Catalog. Describes and illustrates a line of woven wire fence, which can be supplied with either a painted or galvanized finish, together with gates of different types and tubular steel posts for factory inclosures. Mention is also made of the use of woven wire for factory stock and toolroom partitions and as guards for windows, belts and machines.

Metal Melting Furnace.—Monarch Engineering & Mfg. Co., Baltimore. Circular. Points out the advantages of using a vertical type of non-crucible tilting metal melting furnace where a small quick melt is desired without using crucibles. Views of the furnace which can be equipped for using either oil or gas fuel for melting ordinary foundry mixtures including brass, copper, monel-metal, nickel, aluminum, bronze gold, silver, etc., supplement the description of the furnace and the instructions for charging and operating it. Specia emphasis is laid upon the valves provided to adjust the proportions of gas and air to give a neutral, oxidizing or reducing flame which is tangential, the heat being radiate and not bearing directly on the metal.

Planing Machines.—Liberty Machine Tool Co., Hamil ton, Ohio. Circular. Describes a new machine for handlin work not exceeding 36 in. square. A general description o the machine is presented and special emphasis is made upo the rigid construction used. Detail specifications are include

Mechanical Stoker.—Combustion Engineering Corpora tion, New York. Bulletin C1. Illustrates the Coxe mechan cal stoker. There is no text in the bulletin which consist entirely of views of the stoker and its various parts an plants in which it has been installed.

Double-Spindle Grinding Machine.—S. B. Patch Sons Co., Streator, Ill. Circular. Mentions a double-spind grinding machine for mounting wheels 18 in. in diamete which was illustrated in THE IRON AGE, Sept. 13, 1917. brief description and condensed table of specifications are pr sented and are supplemented by two illustrations of t machine itself.

Forging, Heating and Annealing Furnaces.—W. Rockwell Co., 50 Church Street, New York. Two bulleti The first, No. 34, describes a line of forging and heati furnaces of the economizer shield type. The parts played the various factors of the machine, the fuel a the operator singly and in combination on the producti cost of forgings are briefly touched upon followed by a scription of the design and constructions of the furnac the text being supplemented by numerous illustrations. T other bulletin, No. 35, presents information on the fact to be considered in the selection of an annealing furnace the rolling mill type. These include the feeding of the w from one or both ends, the use of single or twin chamb and the size of the chamber. The text is supplemented b number of illustrations and installation views of furnaces various types.

Reinforced Concrete Building Products.—Trus Steel Co., Youngstown, Ohio. Catalog. Size 3½ x 6 pages, 104. Illustrates and describes briefly an extens line of products for use in the construction of reinforced c

crete buildings. The lines covered include reinforcing bars, metal lath, pressed steel joists and stubs, corner bars, inserts for shafting hangers and electric light fixtures, steel sash, hollow tile, steel partitions, etc. The catalog is a compact digest of the various publications covering the individual lines and contains tables of carrying capacities, strengths, etc.

Cooling Towers.—Wheeler Condenser & Engineering Co., Carteret, N. J. Bulletin No. 109-B. Size, 8 x 10½ in.; pages, 28. Presents illustrations of various designs of Wheeler-Balcke cooling towers ranging in capacity from a few thousand to almost a few gallons. The influence of scientific design of condensers and cooling towers on the economy of condensing operation and the economy of this type of tower is touched upon followed by a description of the construction. Mention is also made of the Wheeler-Barnard type of tower in which natural and forced draft are combined.

Illumination.—Holophane Glass Co., 340 Madison Avenue, New York. Booklet No. 163, entitled "Scientific Industrial Illumination." Size, 6 x 9 in.; pages, 36. Covers the question of scientific illumination of industrial establishments from the standponts of the economic advantages, the fundamental principles involved and the equipment required. Under the last head new types of units for shop, factory, office and drafting room illumination and yard and protective lighting are illustrated and described. Considerable useful engineering information on the subject is included.

Plain Grinding Machine.—Ott Grinder Co., Indianapolis. Circular. Concerned with a plain grinding machine for handling work 5 in. in diameter and not more than 18 in. long. A description of the machine which is designed primarily for producing small duplicate straight or taper cylindrical parts in large quantities is presented, and an illustration and condensed table of specifications are included.

Steel Monitor Sash.—Detroit Steel Products Co., Detroit. Catalog section No. 2. Relates to the Fenestra line of monitor sash and the mechanical operating devices employed in connection with it. After a brief discussion of the types of sash which should be used in a monitor, the three different styles which can be supplied—the balanced, top hung and rolling construction arrangements—are described with illustrations of the various industrial establishments in which the sash has been installed. A number of detail drawings are included. The operating devices mentioned consist of a worm and gear arrangement and the continuous operating type.

Copperclad Steel Wire.—Page Steel & Wire Co., Monessen, Pa. Book. Size, 6 x 9 in.; pages, 104. Deals with a line of copperclad steel wire. Notes on the manufacture of wire in general are included, together with test results and data on the physical and electrical properties of the company's Copperweld wire. Specifications and suggestions for determining the sizes of wire for various purposes and considerable useful information of other kinds are included.

Steel Burnishing Balls.—Abbott Ball Co., Elmwood, Hartford, Conn. Catalog. Describes the company's steel ball process for burnishing small metal parts. In this process a barrel that is comparatively narrow is employed, so that the weight of several hundred pounds of burnishing balls is concentrated upon the work at the bottom of the barrel The different styles of barrels are illustrated and tables of dimensions and capacities of each are given. Emphasis is laid upon the fact that the balls used in these barrels are specially manufactured and carbonized and are hardened entirely through. An alphabetical list of the articles that are being finished daily by this process is presented and covers a wide range.

Motor Trucks.—Packard Motor Car Co., Detroit. Bulletin No. 40. Treats of the advantages of using a 4-ton truck instead of overloading a 3-ton one, or carrying a partial load in a 5-ton vehicle. A number of views of the truck in use are included.

Pneumatic Tools and Air Compressor.—Ingersoll-Rand Co., 11 Broadway, New York. Two circulars and one bulletin. The circulars, Nos. 888 and 901, pertain to an extensive line of pneumatic tools, which includes a cleaner for evaporator tubes, drills of all kinds, hammers, grinders, etc. The story is told by illustrations of the different tools and condensed tables of specifications, rather than by any detailed descriptive matter. The bulletin, No. 3015-1, calls attention to a portable mine car air compressor for use in mines wherever electric current is available. Views of the compressor are presented to supplement a brief text description.

Waste Water Evaporators.—Wheeler Condenser & Engineering Co., Carteret, N. J. Booklet. Shows how a multiple effect vapor reversing evaporator is especially suited to the concentration of waste waters or liquors in numerous industries which are very dilute and contain but a small percentage of valuable solid matter. The economic possibilities of the evaporator are discussed as well as the effect of the evaporator in producing high-density solutions. The booklet explains the method of film evaporation employed. Mention is made of some of the solutions that are not waste waters but which can be handled by these evaporators, and a number of tables of useful information are included.

Highway Tractor.—Knox Motors Associates, Springfield, Mass. Circular. Contains illustrations, brief descriptions and condensed specification tables of a tractor unit and a semi-trailer to increase highway transportation. Mention is also made of a trailer axle equipment for use where it is desirable to have a trailer body of special design either built or obtained by converting over an existing horse-drawn vehicle.

Radiators.—F & K Products Co., 601 Swetland Building, Cleveland. Bulletin. Describes and illustrates a hot blast radiator which is made up of single sections, each having a divided steam chamber. This arrangement is relied upon to eliminate air binding and make every foot of surface effective for heating purposes. The exterior surface of the section is extended and cored to insure perfect impingement of air. The sections of the radiator are assembled by slip nipples without flanges or gaskets.

Steel Sash.—Detroit Steel Products Co., 2250 East Grand Boulevard, Detroit. Folder. Illustrates a steel sidewall sash constructed under the supervision of the Underwriters' Laboratories. The advantages of using this sash, which can be supplied in both the pivoted and vertically sliding types, are the elimination of I-beam mullions, the securing of large size single units, the easy combination of standard units to glaze large openings and the use of the same installation details as on standard sash, all of which tend to lower the cost of construction.

Indicating and Recording Pyrometers.—Brown Instrument Co., Philadelphia. Catalog No. 11. Size, 8 x 10½ in.; pages, 80. Lists a complete line of indicating and recording pyrometers and high temperature measuring instruments. These include transformation point, radiation, expansion and mercurial pyrometers, the company's Heatmeter and an automatic temperature control system. The several types of platinum and base metal thermo-couples and protecting tubes which can be supplied are described at length and suggestions for the installation of thermo-couples and methods of standardizing pyrometers are discussed. In addition to the views of the instruments themselves, illustrations of them in use are presented, and a partial list of users grouped according to the different industries is included.

Firebrick Cement.—Botfield Specialties Mfg. Co., Swanson and Clymer streets, Philadelphia. Series of post cards. Refers to the use of the company's Adamant firebrick cement in laying up firebricks. The advantages claimed for the use of the cement are that the bricks are welded together and the infiltration of cold air prevented, with a corresponding increase in the general efficiency of the furnace.

Centrifugal Boiler Feed Pumps.—De Laval Steam Turbine Co., Trenton, N. J. Bulletin N. Describes a combined steam turbine and centrifugal pump for feeding high-pressure steam boilers in which the rotor of the turbine and the impellers of the pump are mounted upon the same shaft with only two bearings and are inclosed in a single housing. The combined casing is split horizontally and by lifting the upper section, all internal and working parts are exposed without disturbing the steam and water connections which are in the lower part of the casing. The turbine is of the velocity-stage type and the pump is equipped with either two or three impellers, according to the boiler pressure. One of the features emphasized in connection with the pump is the small floor space, approximately 6 cu. ft. for 3000 boiler hp., and a corresponding reduction in weight. Pumps with capacities ranging from 2000 to 10,000 boiler hp. are built with a single housing and larger units up to 60,000 hp. can be furnished with the turbine and the pump built separately and mounted on a common base plate. Motor-driven units are also mentioned

Cylinder Grinding Machine.—Hy-Grade Machine Co., Cleveland. Circular. Shows a vertical single-spindle grinding machine for handling various sizes of internal combustion engine cylinders. The cylinders are mounted on a plate that can be drawn past the spindle which is capable of rotation and can be adjusted to travel around the bore of the cylinder while rotating on its own axis, as well as possessing a vertical feed of 22 in. An illustrated description of the machine appeared in THE IRON AGE Oct. 4, 1917.

Sandblast Machinery.—J. W. Paxson Co., 1021 North Delaware Avenue, Philadelphia. Bulletin No. 28. Gives general description and specifications for a line of sandblast machinery, which employs sand, shot or crushed steel as the abrasive material, as well as tumbling barrels, cleaning cabinets and a steel sandblast room. Sifting, drying and conveying equipment for the sand are mentioned, together with various sandblast accessories, such as hose, helmets, eye protectors, gloves, etc. The illustrations include dimensioned drawings of the machines, as well as views of actual installations. A drawing giving a suggestive layout of cleaning room apparatus is included.